

## Nucleic Acids, Proteins, and Antibodies

### *Statement under 37 C.F.R. § 1.77(b)(4)*

[1] This application refers to a "Sequence Listing" listed below, which is provided as an electronic document on two identical compact discs (CD-R), labeled "Copy 1" and "Copy 2." These compact discs each contain the following files, which are hereby incorporated in their entirety herein:

Document	File Name	Size in bytes	Date of Creation
Sequence Listing	PJZ02_seqList.txt	2,365,610	01/15/2001
V Viewer Setup File	SetupDLL.exe	695,808	12/19/2000
V Viewer Help File Controller	v.cnt	7,984	01/05/2001
V Viewer Program File	v.exe	753,664	12/19/2000
V Viewer Help File	v.hlp	447,766	01/05/2001

[2] The Sequence Listing may be viewed on an IBM-PC machine running the MS-Windows operating system by using the V viewer software, licensed by HGS, Inc., included on the compact discs (see World Wide Web URL: <http://www.fileviewer.com>).

### *Field of the Invention*

[3] The present invention relates to novel proteins. More specifically, isolated nucleic acid molecules are provided encoding novel polypeptides. Novel polypeptides and antibodies that bind to these polypeptides are provided. Also provided are vectors, host cells, and recombinant and synthetic methods for producing human polynucleotides and/or polypeptides, and antibodies. The invention further relates to diagnostic and therapeutic methods useful for diagnosing, treating, preventing and/or prognosing disorders related to

these novel polypeptides. The invention further relates to screening methods for identifying agonists and antagonists of polynucleotides and polypeptides of the invention. The present invention further relates to methods and/or compositions for inhibiting or enhancing the production and function of the polypeptides of the present invention.

### ***Background of the Invention***

[4] The brain regulates every aspect of human behavior and physiology, from movement, heart rate, blood pressure, and body temperature, to language, emotion, and memories. The prominence of the nervous system among other bodily systems is evidenced by the disproportionate amount of resources consumed by the brain. While comprising only 2% of the body's weight, the brain consumes 20% of the body's oxygen, 25% of the body's glucose, and receives 15% of the cardiac output (see Circulation and energy metabolism of the brain. In: Siegel G, Agranoff B, Albers RW, and Molinoff P, eds. Basic Neurochemistry: molecular, cellular, and medical aspects. 4th ed. New York: Raven Press (1989)).

[5] The nervous system is organized into the central nervous system (CNS; comprising the brain and spinal cord), and the peripheral nervous system (PNS; comprising the network of nerves that connects the brain and spinal cord to the rest of the body). The basic functional units of the CNS and PNS are neurons, usually composed of dendrites (branching specializations which receive input from other neurons), a cell body (containing the machinery to sustain cellular functions), and an axon (which transmits electrical signals to other neurons or muscle cells). Electrical impulses, propagated along axons by voltage-gated ion channels, are converted to chemical signals at junctions between neurons called synapses. Calcium-mediated exocytosis of storage vesicles in the axon terminal leads to neurotransmitter release into the synaptic cleft. The signaling molecules passively diffuse to the postsynaptic membrane and bind to neurotransmitter-specific receptor proteins. Depending on the type of receptor activated, neurotransmitter binding can have a variety of effects on the postsynaptic cell, including activation of second messenger biochemical cascades and modulation of ion channel permeability. These biochemical and biophysical changes influence the subsequent behavior of the neuron, for example making the cell more or less excitable to incoming signals.



[6] The elaborate circuitry of the adult nervous system arises through an interaction between genetically programmed growth patterns and environmental influences. During embryonic development, neural connections are formed via the programmed extension of axons under the influence of local molecular cues. Through post-natal development, this coarse pattern of connections is refined based on specific interactions between the child and the environment. It is believed that there are critical periods of neural development in childhood, during which environmental stimulation has a more profound effect on nervous system organization than during adulthood. For example, it is known that sensory deprivation in early childhood (such as blindness or deafness), leads to measurable differences in brain organization (see, for examples, Roder et al., *Nature* 400(6740):162-6 (1999); Buchel et al., *Brain* 121 ( Pt 3):409-19 (1998)).

[7] Because of its integral role in human behavior and physiology, disorders of the nervous system are among the most debilitating diseases known. Since the adult nervous system has very limited ability to regenerate, neural injury due to illness or trauma can produce life-long impairments. About half of all spinal cord injuries result in permanent loss of movement and sensation in the arms and legs (quadriplegia). Similarly, up to 30% of stroke survivors are left permanently disabled (American Heart Association 2000 Heart and Stroke Statistical Update, Dallas, TX (1999)). Methods of promoting neural tissue regeneration- for example, to repair spinal cord injuries or brain tissue damage- is a major focus of modern neurobiology. However, currently there is no effective way to repair damaged adult neural tissues.

[8] A number of neurological conditions, including schizophrenia, depression, and myasthenia gravis, involve impaired or inappropriate synaptic communication between neurons. Drug therapies designed to correct the synaptic chemical imbalances underlying these disorders, such as dopamine receptor antagonists for schizophrenia and serotonin uptake inhibitors for depression, have had varying degrees of success, at the cost of sometimes serious side-effects.

[9] The immune system is suspected to play a role in some neurological disorders and conditions. For example, multiple sclerosis, which is characterized by sensory impairments (tingling, numbness, dizziness, loss of vision) and motor impairments (tremor, weakness, loss of coordination), is thought to be an autoimmune disorder in which immune cells destroy the insulating myelin sheath covering axons. In addition, the inflammatory immune response can be a serious complication of brain injury (e.g. trauma and stroke),

spinal cord damage, and infection (e.g. encephalitis and meningitis), and may be a common pathological mechanism in many other neurological disorders (Hays, Curr. Pharm. Des. 4:335-48 (1998); Halliday et al., Clin. Exp. Pharmacol. Physiol. 27:1-8 (2000)).

[10] The field of neurobiology is only beginning to uncover the biological basis of neurological diseases. In fact, in most cases the underlying cause or causes remain poorly understood. Thus, the discovery of new human nervous system-associated polynucleotides, the polypeptides encoded by them, and antibodies that immunospecifically bind these polypeptides, satisfies a need in the art by providing new compositions which are useful in the diagnosis, treatment, prevention and/or prognosis of neurological diseases, disorders, and/or conditions, including, but not limited to, neuropsychiatric disorders, neurodegenerative diseases, vascular disorders, developmental disorders, infections, and neoplastic disorders.

### ***Summary of the Invention***

[11] The present invention relates to novel proteins. More specifically, isolated nucleic acid molecules are provided encoding novel polypeptides. Novel polypeptides and antibodies that bind to these polypeptides are provided. Also provided are vectors, host cells, and recombinant and synthetic methods for producing human polynucleotides and/or polypeptides, and antibodies. The invention further relates to diagnostic and therapeutic methods useful for diagnosing, treating, preventing and/or prognosing disorders related to these novel polypeptides. The invention further relates to screening methods for identifying agonists and antagonists of polynucleotides and polypeptides of the invention. The present invention further relates to methods and/or compositions for inhibiting or enhancing the production and function of the polypeptides of the present invention.

### ***Detailed Description***

#### **Tables**

[12] Table 1A summarizes some of the polynucleotides encompassed by the invention (including cDNA clones related to the sequences (Clone ID NO:Z), contig sequences (contig identifier (Contig ID:)) and contig nucleotide sequence identifier (SEQ ID NO:X)) and further summarizes certain characteristics of these polynucleotides and the polypeptides

encoded thereby. The first column provides the gene number in the application for each clone identifier. The second column provides a unique clone identifier, "Clone ID NO:Z", for a cDNA clone related to each contig sequence disclosed in Table 1A. The third column provides a unique contig identifier, "Contig ID:" for each of the contig sequences disclosed in Table 1A. The fourth column provides the sequence identifier, "SEQ ID NO:X", for each of the contig sequences disclosed in Table 1A. The fifth column, "ORF (From-To)", provides the location (i.e., nucleotide position numbers) within the polynucleotide sequence of SEQ ID NO:X that delineate the preferred open reading frame (ORF) that encodes the amino acid sequence shown in the sequence listing and referenced in Table 1A as SEQ ID NO:Y (column 6). Column 7 lists residues comprising predicted epitopes contained in the polypeptides encoded by each of the preferred ORFs (SEQ ID NO:Y). Identification of potential immunogenic regions was performed according to the method of Jameson and Wolf (CABIOS, 4; 181-186 (1988)); specifically, the Genetics Computer Group (GCG) implementation of this algorithm, embodied in the program PEPTIDESTRUCTURE (Wisconsin Package v10.0, Genetics Computer Group (GCG), Madison, Wisc.). This method returns a measure of the probability that a given residue is found on the surface of the protein. Regions where the antigenic index score is greater than 0.9 over at least 6 amino acids are indicated in Table 1A as "Predicted Epitopes". In particular embodiments, polypeptides of the invention comprise, or alternatively consist of, one, two, three, four, five or more of the predicted epitopes described in Table 1A. It will be appreciated that depending on the analytical criteria used to predict antigenic determinants, the exact address of the determinant may vary slightly. Column 8, "Tissue Distribution" shows the expression profile of tissue, cells, and/or cell line libraries which express the polynucleotides of the invention. The first number in column 8 (preceding the colon), represents the tissue/cell source identifier code corresponding to the key provided in Table 4. Expression of these polynucleotides was not observed in the other tissues and/or cell libraries tested. For those identifier codes in which the first two letters are not "AR", the second number in column 8 (following the colon), represents the number of times a sequence corresponding to the reference polynucleotide sequence (e.g., SEQ ID NO:X) was identified in the tissue/cell source. Those tissue/cell source identifier codes in which the first two letters are "AR" designate information generated using DNA array technology. Utilizing this technology, cDNAs were amplified by PCR and then transferred, in duplicate, onto the array. Gene expression was assayed through hybridization of first strand cDNA

probes to the DNA array. cDNA probes were generated from total RNA extracted from a variety of different tissues and cell lines. Probe synthesis was performed in the presence of <sup>33</sup>P dCTP, using oligo(dT) to prime reverse transcription. After hybridization, high stringency washing conditions were employed to remove non-specific hybrids from the array. The remaining signal, emanating from each gene target, was measured using a Phosphorimager. Gene expression was reported as Phosphor Stimulating Luminescence (PSL) which reflects the level of phosphor signal generated from the probe hybridized to each of the gene targets represented on the array. A local background signal subtraction was performed before the total signal generated from each array was used to normalize gene expression between the different hybridizations. The value presented after "[array code]:" represents the mean of the duplicate values, following background subtraction and probe normalization. One of skill in the art could routinely use this information to identify normal and/or diseased tissue(s) which show a predominant expression pattern of the corresponding polynucleotide of the invention or to identify polynucleotides which show predominant and/or specific tissue and/or cell expression. Column 9 provides the chromosomal location of polynucleotides corresponding to SEQ ID NO:X. Chromosomal location was determined by finding exact matches to EST and cDNA sequences contained in the NCBI (National Center for Biotechnology Information) UniGene database. Given a presumptive chromosomal location, disease locus association was determined by comparison with the Morbid Map, derived from Online Mendelian Inheritance in Man (Online Mendelian Inheritance in Man, OMIM™. McKusick-Nathans Institute for Genetic Medicine, Johns Hopkins University (Baltimore, MD) and National Center for Biotechnology Information, National Library of Medicine (Bethesda, MD) 2000. World Wide Web URL: <http://www.ncbi.nlm.nih.gov/omim/>). If the putative chromosomal location of the Query overlaps with the chromosomal location of a Morbid Map entry, an OMIM identification number is disclosed in column 10 labeled "OMIM Disease Reference(s)". A key to the OMIM reference identification numbers is provided in Table 5.

[13] Table 1B summarizes additional polynucleotides encompassed by the invention (including cDNA clones related to the sequences (Clone ID NO:Z), contig sequences (contig identifier (Contig ID:) contig nucleotide sequence identifiers (SEQ ID NO:X)), and genomic sequences (SEQ ID NO:B). The first column provides a unique clone identifier, "Clone ID NO:Z", for a cDNA clone related to each contig sequence. The second column provides the sequence identifier, "SEQ ID NO:X", for each contig sequence. The third

column provides a unique contig identifier, "Contig ID:" for each contig sequence. The fourth column, provides a BAC identifier "BAC ID NO:A" for the BAC clone referenced in the corresponding row of the table. The fifth column provides the nucleotide sequence identifier, "SEQ ID NO:B" for a fragment of the BAC clone identified in column four of the corresponding row of the table. The sixth column, "Exon From-To", provides the location (i.e., nucleotide position numbers) within the polynucleotide sequence of SEQ ID NO:B which delineate certain polynucleotides of the invention that are also exemplary members of polynucleotide sequences that encode polypeptides of the invention (e.g., polypeptides containing amino acid sequences encoded by the polynucleotide sequences delineated in column six, and fragments and variants thereof).

[14] Table 2 summarizes homology and features of some of the polypeptides of the invention. The first column provides a unique clone identifier, "Clone ID NO:Z", corresponding to a cDNA clone disclosed in Table 1A. The second column provides the unique contig identifier, "Contig ID:" corresponding to contigs in Table 1A and allowing for correlation with the information in Table 1A. The third column provides the sequence identifier, "SEQ ID NO:X", for the contig polynucleotide sequence. The fourth column provides the analysis method by which the homology/identity disclosed in the Table was determined. Comparisons were made between polypeptides encoded by the polynucleotides of the invention and either a non-redundant protein database (herein referred to as "NR"), or a database of protein families (herein referred to as "PFAM") as further described below. The fifth column provides a description of the PFAM/NR hit having a significant match to a polypeptide of the invention. Column six provides the accession number of the PFAM/NR hit disclosed in the fifth column. Column seven, "Score/Percent Identity", provides a quality score or the percent identity, of the hit disclosed in columns five and six. Columns 8 and 9, "NT From" and "NT To" respectively, delineate the polynucleotides in "SEQ ID NO:X" that encode a polypeptide having a significant match to the PFAM/NR database as disclosed in the fifth and sixth columns. In specific embodiments polypeptides of the invention comprise, or alternatively consist of, an amino acid sequence encoded by a polynucleotide in SEQ ID NO:X as delineated in columns 8 and 9, or fragments or variants thereof.

[15] Table 3 provides polynucleotide sequences that may be disclaimed according to certain embodiments of the invention. The first column provides a unique clone identifier, "Clone ID", for a cDNA clone related to contig sequences disclosed in Table 1A. The

second column provides the sequence identifier, "SEQ ID NO:X", for contig sequences disclosed in Table 1A. The third column provides the unique contig identifier, "Contig ID:", for contigs disclosed in Table 1A. The fourth column provides a unique integer 'a' where 'a' is any integer between 1 and the final nucleotide minus 15 of SEQ ID NO:X, and the fifth column provides a unique integer 'b' where 'b' is any integer between 15 and the final nucleotide of SEQ ID NO:X, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:X, and where b is greater than or equal to a + 14. For each of the polynucleotides shown as SEQ ID NO:X, the uniquely defined integers can be substituted into the general formula of a-b, and used to describe polynucleotides which may be preferably excluded from the invention. In certain embodiments, preferably excluded from the invention are at least one, two, three, four, five, ten, or more of the polynucleotide sequence(s) having the accession number(s) disclosed in the sixth column of this Table (including for example, published sequence in connection with a particular BAC clone). In further embodiments, preferably excluded from the invention are the specific polynucleotide sequence(s) contained in the clones corresponding to at least one, two, three, four, five, ten, or more of the available material having the accession numbers identified in the sixth column of this Table (including for example, the actual sequence contained in an identified BAC clone).

[16] Table 4 provides a key to the tissue/cell source identifier code disclosed in Table 1A, column 8. Column 1 provides the tissue/cell source identifier code disclosed in Table 1A, Column 8. Columns 2-5 provide a description of the tissue or cell source. Codes corresponding to diseased tissues are indicated in column 6 with the word "disease". The use of the word "disease" in column 6 is non-limiting. The tissue or cell source may be specific (e.g. a neoplasm), or may be disease-associated (e.g., a tissue sample from a normal portion of a diseased organ). Furthermore, tissues and/or cells lacking the "disease" designation may still be derived from sources directly or indirectly involved in a disease state or disorder, and therefore may have a further utility in that disease state or disorder. In numerous cases where the tissue/cell source is a library, column 7 identifies the vector used to generate the library.

[17] Table 5 provides a key to the OMIM reference identification numbers disclosed in Table 1A, column 10. OMIM reference identification numbers (Column 1) were derived from Online Mendelian Inheritance in Man (Online Mendelian Inheritance in Man, OMIM. McKusick-Nathans Institute for Genetic Medicine, Johns Hopkins University (Baltimore,

MD) and National Center for Biotechnology Information, National Library of Medicine, (Bethesda, MD) 2000. World Wide Web URL: <http://www.ncbi.nlm.nih.gov/omim/>). Column 2 provides diseases associated with the cytologic band disclosed in Table 1A, column 9, as determined using the Morbid Map database.

[18] Table 6 summarizes ATCC Deposits, Deposit dates, and ATCC designation numbers of deposits made with the ATCC in connection with the present application.

[19] Table 7 shows the cDNA libraries sequenced, and ATCC designation numbers and vector information relating to these cDNA libraries.

[20] Table 8 provides a physical characterization of clones encompassed by the invention. The first column provides the unique clone identifier, "Clone ID NO:Z", for certain cDNA clones of the invention, as described in Table 1A. The second column provides the size of the cDNA insert contained in the corresponding cDNA clone.

### **Definitions**

[21] The following definitions are provided to facilitate understanding of certain terms used throughout this specification.

[22] In the present invention, "isolated" refers to material removed from its original environment (e.g., the natural environment if it is naturally occurring), and thus is altered "by the hand of man" from its natural state. For example, an isolated polynucleotide could be part of a vector or a composition of matter, or could be contained within a cell, and still be "isolated" because that vector, composition of matter, or particular cell is not the original environment of the polynucleotide. The term "isolated" does not refer to genomic or cDNA libraries, whole cell total or mRNA preparations, genomic DNA preparations (including those separated by electrophoresis and transferred onto blots), sheared whole cell genomic DNA preparations or other compositions where the art demonstrates no distinguishing features of the polynucleotide/sequences of the present invention.

[23] As used herein, a "polynucleotide" refers to a molecule having a nucleic acid sequence encoding SEQ ID NO:Y or a fragment or variant thereof; a nucleic acid sequence contained in SEQ ID NO:X (as described in column 3 of Table 1A) or the complement thereof; a cDNA sequence contained in Clone ID NO:Z (as described in column 2 of Table 1A and contained within a library deposited with the ATCC); a nucleotide sequence encoding the polypeptide encoded by a nucleotide sequence in SEQ ID NO:B as defined in

column 6 of Table 1B or a fragment or variant thereof; or a nucleotide coding sequence in SEQ ID NO:B as defined in column 6 of Table 1B or the complement thereof. For example, the polynucleotide can contain the nucleotide sequence of the full length cDNA sequence, including the 5' and 3' untranslated sequences, the coding region, as well as fragments, epitopes, domains, and variants of the nucleic acid sequence. Moreover, as used herein, a "polypeptide" refers to a molecule having an amino acid sequence encoded by a polynucleotide of the invention as broadly defined (obviously excluding poly-Phenylalanine or poly-Lysine peptide sequences which result from translation of a polyA tail of a sequence corresponding to a cDNA).

[24] In the present invention, "SEQ ID NO:X" was often generated by overlapping sequences contained in multiple clones (contig analysis). A representative clone containing all or most of the sequence for SEQ ID NO:X is deposited at Human Genome Sciences, Inc. (HGS) in a catalogued and archived library. As shown, for example, in column 2 of Table 1A, each clone is identified by a cDNA Clone ID (identifier generally referred to herein as Clone ID NO:Z). Each Clone ID is unique to an individual clone and the Clone ID is all the information needed to retrieve a given clone from the HGS library. Furthermore, certain clones disclosed in this application have been deposited with the ATCC on October 5, 2000, having the ATCC designation numbers PTA 2574 and PTA 2575; and on January 5, 2001, having the depositor reference numbers TS-1, TS-2, AC-1, and AC-2. In addition to the individual cDNA clone deposits, most of the cDNA libraries from which the clones were derived were deposited at the American Type Culture Collection (hereinafter "ATCC"). Table 7 provides a list of the deposited cDNA libraries. One can use the Clone ID NO:Z to determine the library source by reference to Tables 6 and 7. Table 7 lists the deposited cDNA libraries by name and links each library to an ATCC Deposit. Library names contain four characters, for example, "HTWE." The name of a cDNA clone (Clone ID) isolated from that library begins with the same four characters, for example "HTWEP07". As mentioned below, Table 1A correlates the Clone ID names with SEQ ID NO:X. Thus, starting with an SEQ ID NO:X, one can use Tables 1, 6 and 7 to determine the corresponding Clone ID, which library it came from and which ATCC deposit the library is contained in. Furthermore, it is possible to retrieve a given cDNA clone from the source library by techniques known in the art and described elsewhere herein. The ATCC is located at 10801 University Boulevard, Manassas, Virginia 20110-2209, USA. The ATCC



deposits were made pursuant to the terms of the Budapest Treaty on the international recognition of the deposit of microorganisms for the purposes of patent procedure.

[25] In specific embodiments, the polynucleotides of the invention are at least 15, at least 30, at least 50, at least 100, at least 125, at least 500, or at least 1000 continuous nucleotides but are less than or equal to 300 kb, 200 kb, 100 kb, 50 kb, 15 kb, 10 kb, 7.5kb, 5 kb, 2.5 kb, 2.0 kb, or 1 kb, in length. In a further embodiment, polynucleotides of the invention comprise a portion of the coding sequences, as disclosed herein, but do not comprise all or a portion of any intron. In another embodiment, the polynucleotides comprising coding sequences do not contain coding sequences of a genomic flanking gene (i.e., 5' or 3' to the gene of interest in the genome). In other embodiments, the polynucleotides of the invention do not contain the coding sequence of more than 1000, 500, 250, 100, 50, 25, 20, 15, 10, 5, 4, 3, 2, or 1 genomic flanking gene(s).

[26] A "polynucleotide" of the present invention also includes those polynucleotides capable of hybridizing, under stringent hybridization conditions, to sequences contained in SEQ ID NO:X, or the complement thereof (e.g., the complement of any one, two, three, four, or more of the polynucleotide fragments described herein), the polynucleotide sequence delineated in columns 8 and 9 of Table 2 or the complement thereof, and/or cDNA sequences contained in Clone ID NO:Z (e.g., the complement of any one, two, three, four, or more of the polynucleotide fragments, or the cDNA clone within the pool of cDNA clones deposited with the ATCC, described herein), and/or the polynucleotide sequence delineated in column 6 of Table 1B or the complement thereof. "Stringent hybridization conditions" refers to an overnight incubation at 42 degree C in a solution comprising 50% formamide, 5x SSC (750 mM NaCl, 75 mM trisodium citrate), 50 mM sodium phosphate (pH 7.6), 5x Denhardt's solution, 10% dextran sulfate, and 20 µg/ml denatured, sheared salmon sperm DNA, followed by washing the filters in 0.1x SSC at about 65 degree C.

[27] Also contemplated are nucleic acid molecules that hybridize to the polynucleotides of the present invention at lower stringency hybridization conditions. Changes in the stringency of hybridization and signal detection are primarily accomplished through the manipulation of formamide concentration (lower percentages of formamide result in lowered stringency); salt conditions, or temperature. For example, lower stringency conditions include an overnight incubation at 37 degree C in a solution comprising 6X SSPE (20X SSPE = 3M NaCl; 0.2M NaH<sub>2</sub>PO<sub>4</sub>; 0.02M EDTA, pH 7.4), 0.5% SDS, 30% formamide, 100 ug/ml salmon sperm blocking DNA; followed by washes

at 50 degree C with 1XSSPE, 0.1% SDS. In addition, to achieve even lower stringency, washes performed following stringent hybridization can be done at higher salt concentrations (e.g. 5X SSC).

[28] Note that variations in the above conditions may be accomplished through the inclusion and/or substitution of alternate blocking reagents used to suppress background in hybridization experiments. Typical blocking reagents include Denhardt's reagent, BLOTTO, heparin, denatured salmon sperm DNA, and commercially available proprietary formulations. The inclusion of specific blocking reagents may require modification of the hybridization conditions described above, due to problems with compatibility.

[29] Of course, a polynucleotide which hybridizes only to polyA<sup>+</sup> sequences (such as any 3' terminal polyA<sup>+</sup> tract of a cDNA shown in the sequence listing), or to a complementary stretch of T (or U) residues, would not be included in the definition of "polynucleotide," since such a polynucleotide would hybridize to any nucleic acid molecule containing a poly (A) stretch or the complement thereof (e.g., practically any double-stranded cDNA clone generated using oligo dT as a primer).

[30] The polynucleotide of the present invention can be composed of any polyribonucleotide or polydeoxribonucleotide, which may be unmodified RNA or DNA or modified RNA or DNA. For example, polynucleotides can be composed of single- and double-stranded DNA, DNA that is a mixture of single- and double-stranded regions, single- and double-stranded RNA, and RNA that is mixture of single- and double-stranded regions, hybrid molecules comprising DNA and RNA that may be single-stranded or, more typically, double-stranded or a mixture of single- and double-stranded regions. In addition, the polynucleotide can be composed of triple-stranded regions comprising RNA or DNA or both RNA and DNA. A polynucleotide may also contain one or more modified bases or DNA or RNA backbones modified for stability or for other reasons. "Modified" bases include, for example, tritylated bases and unusual bases such as inosine. A variety of modifications can be made to DNA and RNA; thus, "polynucleotide" embraces chemically, enzymatically, or metabolically modified forms.

[31] The polypeptide of the present invention can be composed of amino acids joined to each other by peptide bonds or modified peptide bonds, i.e., peptide isosteres, and may contain amino acids other than the 20 gene-encoded amino acids. The polypeptides may be modified by either natural processes, such as posttranslational processing, or by chemical modification techniques which are well known in the art. Such modifications are well

described in basic texts and in more detailed monographs, as well as in a voluminous research literature. Modifications can occur anywhere in a polypeptide, including the peptide backbone, the amino acid side-chains and the amino or carboxyl termini. It will be appreciated that the same type of modification may be present in the same or varying degrees at several sites in a given polypeptide. Also, a given polypeptide may contain many types of modifications. Polypeptides may be branched, for example, as a result of ubiquitination, and they may be cyclic, with or without branching. Cyclic, branched, and branched cyclic polypeptides may result from posttranslation natural processes or may be made by synthetic methods. Modifications include acetylation, acylation, ADP-ribosylation, amidation, covalent attachment of flavin, covalent attachment of a heme moiety, covalent attachment of a nucleotide or nucleotide derivative, covalent attachment of a lipid or lipid derivative, covalent attachment of phosphatidylinositol, cross-linking, cyclization, disulfide bond formation, demethylation, formation of covalent cross-links, formation of cysteine, formation of pyroglutamate, formylation, gamma-carboxylation, glycosylation, GPI anchor formation, hydroxylation, iodination, methylation, myristoylation, oxidation, pegylation, proteolytic processing, phosphorylation, prenylation, racemization, selenoylation, sulfation, transfer-RNA mediated addition of amino acids to proteins such as arginylation, and ubiquitination. (See, for instance, PROTEINS - STRUCTURE AND MOLECULAR PROPERTIES, 2nd Ed., T. E. Creighton, W. H. Freeman and Company, New York (1993); POSTTRANSLATIONAL COVALENT MODIFICATION OF PROTEINS, B. C. Johnson, Ed., Academic Press, New York, pgs. 1-12 (1983); Seifter et al., Meth. Enzymol. 182:626-646 (1990); Rattan et al., Ann. N.Y. Acad. Sci. 663:48-62 (1992)).

[32] "SEQ ID NO:X" refers to a polynucleotide sequence described, for example, in Tables 1A or 2, while "SEQ ID NO:Y" refers to a polypeptide sequence described in column 6 of Table 1A. SEQ ID NO:X is identified by an integer specified in column 4 of Table 1A. The polypeptide sequence SEQ ID NO:Y is a translated open reading frame (ORF) encoded by polynucleotide SEQ ID NO:X. "Clone ID NO:Z" refers to a cDNA clone described in column 2 of Table 1A.

[33] "A polypeptide having functional activity" refers to a polypeptide capable of displaying one or more known functional activities associated with a full-length (complete) protein. Such functional activities include, but are not limited to, biological activity, antigenicity [ability to bind (or compete with a polypeptide for binding) to an anti-

polypeptide antibody], immunogenicity (ability to generate antibody which binds to a specific polypeptide of the invention), ability to form multimers with polypeptides of the invention, and ability to bind to a receptor or ligand for a polypeptide.

[34] The polypeptides of the invention can be assayed for functional activity (e.g. biological activity) using or routinely modifying assays known in the art, as well as assays described herein. Specifically, one of skill in the art may routinely assay nervous system polypeptides (including fragments and variants) of the invention for activity using assays as described in Examples 24, 34, 37, 48, and 59.

[35] "A polypeptide having biological activity" refers to a polypeptide exhibiting activity similar to, but not necessarily identical to, an activity of a polypeptide of the present invention, including mature forms, as measured in a particular biological assay, with or without dose dependency. In the case where dose dependency does exist, it need not be identical to that of the polypeptide, but rather substantially similar to the dose-dependence in a given activity as compared to the polypeptide of the present invention (i.e., the candidate polypeptide will exhibit greater activity or not more than about 25-fold less and, preferably, not more than about tenfold less activity, and most preferably, not more than about three-fold less activity relative to the polypeptide of the present invention).

[36] Table 1A summarizes some of the polynucleotides encompassed by the invention (including contig sequences (SEQ ID NO:X) and clones (Clone ID NO:Z) and further summarizes certain characteristics of these polynucleotides and the polypeptides encoded thereby.

**Polynucleotides and Polypeptides of the Invention****TABLE 1A**

Gene No:	Clone ID NO: Z	Contig ID:	SEQ ID NO: X	ORF (From-To)	AA SEQ ID NO: Y	Predicted Epitopes	Tissue Distribution Library code: count (see Table IV for Library Codes)	Cytologic Band	OMIM Disease Reference(s):
1	HTPAD46	1048901	11	1567 - 1148	609		AR061: 0, AR089: 0 L0794: 4, H0039: 2, S0358: 1, H0013: 1, H0575: 1, L0770: 1, L0769: 1 and L0749: 1.		
		503313	335	103 - 309	933	His-50 to Leu-69.			
		1092566	12	628 - 227	610		AR089: 15, AR061: 6 H0305: 2		
2	HCWFF88	506577	336	41 - 187	934	Pro-1 to Gly-6, Ala-41 to Leu-47.			
		1198889	13	209 - 361	611		H0135: 1 and H0063: 1.		
3	HSSAX53	507509	337	209 - 361	935				
		522739	14	3 - 410	612	Val-1 to Lys-8, Pro-36 to Lys-41, Gln-49 to Lys-57, Ser-63 to Ser-70, Asp-79 to Gln-92, Asn-103 to Thr-122.	AR089: 1, AR061: 1 H0052: 1 and T0067: 1.		
4	HCEPH71								

# TABLE "A" Sheet 60

5	HTEDF74	1083405	15	2 - 970	613	Pro-37 to Trp-53, Arg-56 to Pro-62.	AR061: 3, AR089: 2 L0731: 2, H0341: 1, H0392: 1, H0038: 1, H0641: 1, L0803: 1 and H0445: 1.		
		522982	338	3 - 575	936	Pro-20 to Trp-36, Arg-39 to Pro-45, Gly-62 to Glu-69, Asp-77 to Lys-82, Pro-87 to Ala-93.			
6	HTTEK47	1134534	16	2 - 1009	614	Val-21 to Pro-27.	AR061: 8, AR089: 6 L0439: 5, H0622: 3, H0040: 2, L0794: 2, L0805: 2, L0758: 2, L0803: 1, L0375: 1, L0659: 1, L0789: 1, L0665: 1, H0579: 1, L0750: 1, L0779: 1, L0777: 1, L0752: 1 and L0755: 1.		
		573649	339	2 - 349	937	Leu-13 to Val-18, Thr-37 to Lys-46.			
7	HTOBE75	1163883	17	149 - 1075	615	Arg-36 to Gln-44, Ser-49 to Gln-57, Lys-276 to Cys-286.	AR061: 2, AR089: 1 H0038: 3, L0748: 3, L0659: 2, L0743: 2, L0744: 2, H0486: 1, H0421: 1, H0024: 1, H0031: 1, H0272: 1, L0662: 1, L0384: 1, L0809: 1 and L0779: 1.		

8	HCFAT05	591896	1156310	340	1 - 414	938	Leu-21 to Gln-29, Ala-95 to Gly-101, Arg-163 to Gln-172, Ser-183 to Glu-202, Thr-219 to Ser-226, Thr-231 to Ser-238.	AR061: 1, AR089: 1 H0556: 2, H0634: 1, L0766: 1 and H0422: 1.		
		592118		341	2 - 490	939	Arg-1 to His-11, Ser-18 to Gly-27, Gly-36 to Gly-44, Asp-97 to Phe-103, Pro-127 to Gly-132.			
9	HFIH37	1189001		19	69 - 872	617	Lys-65 to Thr-71, Lys-104 to Gly-109, Lys-116 to His-122, Asn-140 to Asp-146, Lys-184 to Lys-203, Glu-205 to Asn-239, Ala-256 to Phe-267.	AR089: 7, AR061: 1 H0457: 2, H0529: 2, H0561: 1, H0521: 1, S0192: 1 and L0600: 1.		
		615597		342	70 - 375	940	Lys-65 to Thr-71.			
10	HFTDF15	1084887		20	475 - 672	618		AR089: 3, AR061: 2 H0563: 1 and H0123: 1.		
		657020		343	129 - 254	941				
11	HPFCU80	1017593		21	341 - 3	619		AR089: 16, AR061: 13 H0163: 3 and H0169: 1.		
		685294		344	162 - 341	942				
12	HSVAV49	1153916		22	767 - 501	620	Pro-19 to Thr-24, Thr-78 to Lys-89.	AR061: 9, AR089: 7 H0309: 1		

13	HWHQC94	689674 1116463	345 23	44 - 208 2 - 916	943 621	Glu-21 to Glu-27.	AR089: 2, AR061: 1 L0665: 4, S0132: 2, L0438: 2, L0439: 2, L0596: 2, H0542: 2, H0543: 2, S0114: 1, H0614: 1, H0592: 1, H0587: 1, S0280: 1, H0253: 1, H0581: 1, H0457: 1, H0012: 1, H0083: 1, H0687: 1, H0290: 1, H0622: 1, H0135: 1, S0150: 1, L0796: 1, L0646: 1, L0643: 1, L0764: 1, L0773: 1, L0649: 1, L0659: 1, L0663: 1, H0658: 1, H0555: 1, H0478: 1, L0752: 1, L0599: 1 and H0506: 1.		
14	HRSM49	715096 1065458 723025	346 24 347	1 - 627 166 - 342 190 - 456	944 622 945	Trp-62 to Pro-67. Phe-16 to Trp-24, Leu-30 to Val-37, Phe-41 to Ile-49. Gln-36 to Ile-46, Ser-55 to Phe-65, Ser-67 to Lys-78.	AR089: 3, AR061: 2 H0394: 1 and L0589: 1.		
15	HFTDY67	1151220	25	1527 - 1	623	Asn-64 to Pro-73, Asp-83 to Glu-94, Leu-144 to Pro-153,	AR089: 89, AR061: 75 S0002: 2, H0521: 2, S0360: 1, H0123: 1,		



						Glu-162 to Thr-167, Asp-178 to Ser-189, Gly-197 to Leu-210, Pro-217 to Pro-222, Arg-234 to Asp-251, Gly-279 to Phe-293, Asp-357 to Gly-367, Gly-379 to Val-396, Glu-421 to Met-426, Asn-441 to Leu-447, Glu-467 to Trp-474.	S0250: 1, L0654: 1, S0152: 1, L0740: 1 and L0749: 1.		
16	HYABL89	745221	348	1 - 228	946	Gly-23 to Phe-37.	AR089: 1, AR061: 1 S0114: 1, H0583: 1 and H0013: 1.		
17	HCUEV29	786157	349	246 - 416	947	Glu-18 to Val-28, Pro-31 to Glu-47, Glu-88 to Asp-94, Ser-154 to Lys-178.	AR089: 1, AR061: 1 H0457: 15, H0271: 11, H0494: 7, H0521: 7, H0141: 6, H0255: 6, S0434: 6, L0758: 5, S0354: 4, S0358: 4, S0278: 4, H0179: 4, L0771: 4, L0783: 4, H0436: 4, H0556: 3, H0069: 3, H0618: 3, L0776: 3, L0659: 3, H0435: 3, H0661: 2, S0418: 2, S0420: 2, H0580: 2, S0222: 2,		

	H0486: 2, H0013: 2, H0581: 2, H0083: 2, H0266: 2, S0003: 2, H0424: 2, S0036: 2, H0090: 2, H0038: 2, H0634: 2, H0616: 2, S0344: 2, S0002: 2, L0770: 2, L0646: 2, L0662: 2, L0381: 2, L0655: 2, L0809: 2, L0666: 2, L0665: 2, S0216: 2, H0703: 2, H0547: 2, H0593: 2, H0670: 2, H0539: 2, S0027: 2, L0748: 2, L0439: 2, L0751: 2, L0591: 2, H0543: 2, H0624: 1, H0650: 1, H0656: 1, S0116: 1, H0484: 1, H0402: 1, S0376: 1, S0444: 1, S0360: 1, S0045: 1, S0046: 1, H0619: 1, S6026: 1, H0261: 1, H0438: 1, H0586: 1, H0559: 1, H0101: 1, H0427: 1, H0036: 1, T0048: 1, H0318: 1, S0474: 1, H0421: 1, H0052: 1, H0205: 1, H0231: 1, L0738: 1.						
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19	HLQDT35	827671	351	147 - 512	949	Asp-15 to Thr-21, Gln-83 to Ile-91.	AR089: 3, AR061: 3 S0358: 8, L0766: 7, L0777: 7, L0731: 7, L0659: 4, L0748: 4, L0751: 4, L0783: 3, L0663: 3, S0418: 2, S0360: 2, H0486: 2, S0010: 2, S0250: 2, S0422: 2, L0763: 2, L0803: 2, L0775: 2, L0789: 2, H0520: 2, L0756: 2, L0752: 2, H0656: 1, S0376: 1, H0208: 1, H0574: 1, H0632: 1, S0414: 1, H0581: 1, H0052: 1, H0024: 1, H0014: 1, H0355: 1, H0688: 1, H0090: 1, H0623: 1, H0509: 1, H0529: 1, L0520: 1, L0761: 1, L0650: 1, L0809: 1, L0666: 1, L0665: 1, S0126: 1, H0684: 1, H0648: 1, S0390: 1, L0740: 1, L0745: 1,	L0789: 1, L0602: 1 and L0439: 1.		
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									L0749: 1, L0750: 1, L0755: 1, L0591: 1, L0362: 1 and S0242: 1.		
20	HDPBS64	839777	352	222 - 494	950				AR089: 1, AR061: 0 S0222: 1, S0002: 1, L0804: 1, L0663: 1 and H0521: 1.		
21	HTBAB41	1052388	31	619 - 798	629				AR089: 30, AR061: 8 S0044: 2, L0748: 2, H0392: 1, H0075: 1, L0770: 1 and H0519: 1.		
22	HTLGE31	867287	353	11 - 178	951				Lys-1 to Asp-7, Gln-47 to Arg-53.		
		870247	32	2 - 307	630				AR089: 163, AR061: 32 H0618: 1, L0368: 1 and S0053: 1.		
23	HWLHK29	1152279	33	3 - 608	631				AR089: 15, AR061: 5 L0754: 5, L0755: 5, S0354: 3, L0483: 3, H0648: 3, L0777: 3, S0374: 2, L0751: 2, L0758: 2, L0605: 2, L0362: 2, H0543: 2, S0114: 1, S0358: 1, H0411: 1, H0575: 1, L0105: 1, H0263: 1, H0596: 1, H0510: 1, S0003: 1, H0166: 1,		

							H0169: 1, H0090: 1, H0059: 1, S0440: 1, L0373: 1, L0372: 1, L0800: 1, L0662: 1, L0794: 1, L0649: 1, L0803: 1, L0804: 1, L0659: 1, L0783: 1, L0809: 1, L0789: 1, L0790: 1, L0666: 1, L0665: 1, S0378: 1, L0602: 1, H0436: 1, L0779: 1, L0780: 1, S0434: 1, S0196: 1 and S0446: 1.		
24	HHEGG20	876064	354	3 - 491	952	Gln-18 to Thr-26.	AR089: 2, AR061: 1 S0360: 1, H0013: 1, L0664: 1 and H0542: 1.		
		1106816	34	3 - 971	632	Arg-4 to Glu-12, Glu-121 to Gly-126, Ala-141 to Pro-146, Gln-161 to Phe-176, Lys-186 to Ser-194.			
		894409	355	26 - 820	953				
25	HDPRU43	1217035	35	1 - 2460	633	Pro-1 to Gly-7, Val-127 to Val-133, Leu-162 to Ser-171, Arg-178 to Glu-185, Pro-195 to Thr-200, Gln-243 to Trp-248, Gln-252 to Asn-265, Glu-313 to Cys-319, His-417 to Glu-422.	AR089: 1, AR061: 1 H0046: 34, L0731: 5, L0534: 4, L0769: 4, H0521: 4, S0356: 3, L0800: 3, L0794: 3, L0439: 3, L0749: 3, L0752: 3, L0759: 3, L0562: 2, H0486: 2, L0803: 2, L0805: 2.		

# TABLE "S2B49450"

						Arg-464 to Ala-473, Met-530 to Lys-538, Arg-594 to Gly-599, Glu-641 to Gly-649, Asp-660 to Ala-668, Arg-705 to Ser-727, Ser-777 to Glu-783, Leu-796 to Gly-806.					L0809: 2, L0789: 2, L0744: 2, L0485: 2, H0556: 1, H0657: 1, H0637: 1, H0580: 1, H0208: 1, H0261: 1, H0609: 1, H0455: 1, H0600: 1, H0586: 1, H0331: 1, H0635: 1, H0618: 1, H0544: 1, H0009: 1, H0050: 1, H0620: 1, H0288: 1, S0312: 1, S0314: 1, H0252: 1, H0688: 1, H0644: 1, S0366: 1, H0135: 1, H0063: 1, H0087: 1, H0551: 1, H0264: 1, S0002: 1, L0639: 1, L0771: 1, L0648: 1, L0766: 1, L0650: 1, L0378: 1, L0655: 1, H0699: 1, H0660: 1, L0743: 1, L0750: 1, L0777: 1, L0758: 1, L0097: 1, S0194: 1 and H0543: 1.				
							909841	356	1 - 342	954	Pro-8 to Gln-16.				
26	HE8PK12	1227647	36	2 - 367	634	Val-30 to Ser-37.						AR089: 6, AR061: 4 L0754: 6, L0777: 6, L0740: 5, L0731: 4, L0758: 4, L0759: 4,			





27	HE9HV92	1227519	37	1 - 1050	635	Gln-43 to Asp-62, Pro-74 to Glu-79, Thr-102 to Phe-109. Asn-2 to Gly-10, Asp-86 to Ile-110, Gly-116 to Gln-121, Ala-135 to Arg-140, Ala-167 to Ser-172, Leu-176 to Lys-183.	AR061: 1, AR089: 0 L0439: 3, H0616: 2, L0749: 2, S0420: 1, H0415: 1, H0013: 1, H0590: 1, S0010: 1, H0046: 1, H0050: 1, H0375: 1, H0615: 1, S0366: 1, H0529: 1, H0144: 1, S0126: 1, S0152: 1, S3014: 1 and L0779: 1.		
28	HOHCE47	911510 1217059	358 38	2 - 1048 578 - 2143	956 636	Thr-1 to Gly-9. Tyr-83 to Ser-92, Leu-118 to Tyr-123, Leu-137 to Ser-143, Gln-148 to Ser-158, Thr-258 to Pro-266, Gln-274 to His-283, Asp-325 to Ser-334, Gln-343 to Thr-349, Ser-366 to Val-378, Arg-381 to Asp-388, Pro-426 to Asn-431, Cys-446 to Ser-457, Leu-469 to Lys-486, Cys-501 to Arg-510.	AR061: 1, AR089: 0 S0040: 1, H0580: 1, S0222: 1, H0355: 1, S0250: 1, L0565: 1 and S0152: 1.		
		911566	359	1 - 429	957	Gly-1 to Trp-6.			

29	HSDII69	1154067	39	74 - 412	637	His-13 to Gly-21, Tyr-61 to Asp-66, Ala-105 to Thr-110.	AR061: 6, AR089: 5 H0328: 4, H0031: 3, L0519: 3, L0748: 2, L0777: 2, L0731: 2, S0260: 2, H0624: 1, S6024: 1, H0650: 1, S0116: 1, H0254: 1, S0007: 1, H0393: 1, H0441: 1, H0438: 1, H0574: 1, H0156: 1, H0599: 1, S0051: 1, H0615: 1, H0039: 1, L0564: 1, L0763: 1, L0766: 1, L0774: 1, L0776: 1, L0659: 1, L0518: 1, L0792: 1, L0666: 1, L0663: 1, S0242: 1 and H0423: 1.		
		917180	360	202 - 540	958	His-13 to Gly-21, Tyr-61 to Asp-66, Ala-105 to Thr-110.			
30	HKAKM10	1227639	40	3 - 2840	638	Leu-15 to Ser-21, Leu-89 to Tyr-94, Gly-130 to Gln-136, Asn-163 to Leu-168, Lys-176 to His-181, Ile-187 to Arg-193, Ala-239 to Thr-244, Pro-263 to Val-268, Ala-401 to Ser-406.	AR089: 1, AR061: 1 L0794: 4, L0438: 4, L0761: 3, L0766: 3, L0748: 3, L0439: 3, H0556: 2, L0602: 2, L0754: 2, L0779: 2, H0580: 1, H0208: 1, H0013: 1, T0082: 1, S0010: 1, H0428: 1,		

									H0553: 1, H0038: 1, H0616: 1, H0494: 1, L0796: 1, L0800: 1, L0773: 1, L0533: 1, L0803: 1, L0776: 1, L0657: 1, L0791: 1, H0520: 1, H0519: 1, H0521: 1, H0187: 1, L0731: 1, S0031: 1 and L0366: 1.		
		918685	361	2 - 547	959	Gly-25 to Gln-31, Asn-58 to Leu-63, Lys-71 to His-76, Ile-82 to Arg-88, Ala-134 to Thr-139.			AR061: 6, AR089: 5		
31	HCEPU56	1226120	41	1037 - 1840	639	Lys-65 to Thr-71, Lys-104 to Gly-109, Lys-116 to His-122, Asn-140 to Asp-146, Lys-184 to Lys-203, Glu-205 to Asn-239, Ala-256 to Phe-267.					
		920347	362	219 - 593	960	Lys-16 to Thr-22, Lys-55 to Gly-60, Lys-67 to His-73, Asn-91 to Asp-97.					
32	HUSHB54	928054	42	125 - 355	640				AR089: 1, AR061: 0 H0056: 3, H0437: 1, H0050: 1 and S0002: 1.		
33	HLMDO95	928344	43	88 - 435	641				AR089: 27, AR061: 11		

34	HHASQ32	1198902	44	50 - 892	642	Gly-1 to Gly-6, Arg-12 to Arg-17, Gln-56 to Ser-71, Glu-82 to Glu-89, Phe-94 to Glu-104, Ala-126 to Asn-131, Pro-167 to Gly-177, Thr-224 to Ala-233, Leu-237 to Lys-281.	AR089: 21, AR061: 7 H0510: 3, S0438: 2, L0803: 2, L0615: 1, S0418: 1, H0393: 1, H0632: 1, H0355: 1, L0774: 1, H0144: 1, L0749: 1, L0750: 1, L0605: 1 and L0581: 1.	H0271: 3, H0250: 2, H0635: 2, S0216: 2, H0254: 1, H0638: 1, H0069: 1, H0416: 1, H0090: 1, L0761: 1, L0800: 1, L0776: 1, L0789: 1 and S0052: 1.		
		928730	363	40 - 855	961	Gly-1 to Gly-6, Arg-12 to Arg-17.				
35	HARAB87	1164340	45	3 - 548	643		AR051: 29, AR050: 24, AR054: 18, AR089: 1, AR061: 0 T0082: 1, T0023: 1 and L0596: 1.			
		933441	364	181 - 768	962					
36	HTNGF69	1152268	46	501 - 803	644	Ser-1 to Gly-23, Gly-85 to Leu-91.	AR061: 3, AR089: 2 L0758: 3, L0666: 2, L0751: 2, L0777: 2, H0663: 1, L0021: 1, H0309: 1, H0688: 1, H0617: 1, H0477: 1,			

									L0766: 1, L0775: 1, L0367: 1, L0789: 1, L0663: 1, L0438: 1, L0749: 1, L0779: 1, L0757: 1 and S0456: 1.		
		933614	365	483 - 785	963	Ser-1 to Gly-23, Gly-85 to Leu-91.					
37	HMSJL96	1154788	47	1 - 1461	645	Thr-15 to Arg-22, Ala-38 to Met-43, Gln-49 to Lys-64, Thr-97 to Gln-108, Tyr-132 to Ser-139, His-219 to Gln-265, Ala-354 to Gly-362, Ser-379 to Ala-386, Asp-402 to Ser-417, Leu-424 to Glu-433, Arg-443 to Gly-459, Ser-463 to Ser-472.			AR054: 16, AR051: 15, AR050: 12, AR089: 0, AR061: 0 L0777: 6, L0758: 5, L0779: 4, L0803: 3, S0358: 2, H0004: 2, L0662: 2, L0775: 2, H0144: 2, S0126: 2, S0328: 2, S3014: 2, S0027: 2, L0743: 2, L0748: 2, H0265: 1, H0656: 1, S0212: 1, H0663: 1, H0638: 1, H0580: 1, H0632: 1, H0486: 1, H0599: 1, H0618: 1, L0105: 1, H0251: 1, H0309: 1, H0544: 1, H0123: 1, H0050: 1, L0471: 1, H0024: 1, H0399: 1, S0003: 1, H0364: 1, H0553: 1, H0038: 1, H0412: 1, H0413: 1,		

38	HDTBT06	1205261	48	3 - 905	646	<p>Thr-15 to Arg-22, Ala-38 to Met-43, Gln-49 to Lys-64, Thr-97 to Gln-108, Thr-131 to Lys-137.</p>	<p>T0041: 1, S0344: 1, S0002: 1, L0598: 1, H0529: 1, L0645: 1, L0363: 1, L0649: 1, L0804: 1, L0805: 1, L0558: 1, L0659: 1, L0528: 1, L0789: 1, L0792: 1, L0666: 1, S0374: 1, H0555: 1, S3012: 1, S0028: 1, S0206: 1, S0032: 1, L0439: 1, L0757: 1, S0031: 1, H0707: 1, S0192: 1, H0423: 1, S0042: 1 and H0008: 1.</p>		
							<p>AR089: 2, AR061: 1 L0754: 6, H0318: 3, H0486: 2, H0014: 2, L0777: 2, H0543: 2, H0171: 1, S6024: 1, H0650: 1, S0354: 1, H0455: 1, H0013: 1, L0483: 1, H0494: 1, S0450: 1, L0520: 1, L0763: 1, L0769: 1,</p>		

									L0641: 1, L0521: 1, L0662: 1, L0774: 1, L0776: 1, L0783: 1, L0663: 1, S0136: 1, H0478: 1, L0742: 1, L0439: 1, L0780: 1, L0592: 1, S0192: 1 and S0424: 1.		
39	HTTIE47	935404	367	1 - 906	965				AR061: 4, AR089: 4 L0615: 1, S0420: 1, H0333: 1, H0286: 1, H0634: 1 and H0144: 1.		
		1165363	49	2 - 574	647						
		941834	368	1 - 567	966						
40	HHFBP47	946668	50	825 - 253	648				AR089: 5, AR061: 5 L0748: 2, L0749: 2, H0085: 1, H0050: 1, H0090: 1 and L0758: 1.		
41	HCCCC81	1083553	51	562 - 2	649				AR089: 12, AR061: 7 H0583: 1, H0675: 1 and H0457: 1.		
		949062	369	139 - 921	967						

42	HPJEV71	1197841	52	976 - 164	650	Glu-186 to Glu-195, Asp-213 to Asn-218.	AR089: 7, AR061: 6 H0521: 2, H0039: 1, H0641: 1, H0529: 1, L0654: 1, H0701: 1, H0518: 1, S0152: 1 and H0522: 1.		
43	HTEIL07	949153 1136121	370 53	269 - 2029 43 - 1143	968 651	Ser-5 to Gly-20. Glu-13 to Asp-29, Glu-50 to Lys-58, Thr-61 to Glu-66, Ala-94 to Tyr-100, Gln-146 to Ser-156, Pro-171 to Asp-177, Ile-179 to Trp-191, Glu-197 to Val-203, Asp-238 to Lys-244, Pro-304 to Ala-315.	AR061: 1, AR089: 0 L0758: 4, L0617: 2, L0794: 2, H0253: 1, H0038: 1, H0616: 1, L0789: 1 and L0779: 1.		
44	HTEAG49	953803 954614	371 54	42 - 443 510 - 208	969 652	Glu-13 to Thr-27.	AR089: 1, AR061: 0 L0759: 4, L0770: 2, S0040: 1, S0318: 1, S0334: 1, S0316: 1, S0340: 1, H0038: 1, L0598: 1, L0800: 1 and S0276: 1.		



45	HSLCF96	637670	55	355 - 1248	653	Val-2 to Trp-7, Lys-9 to Trp-18, Gln-20 to Gly-25, Gln-79 to His-85, Pro-134 to Asp-139, Asp-164 to Thr-171, Pro-223 to Arg-228. Thr-1 to Cys-6, Ser-52 to Gly-57, Gln-111 to His-117.	AR054: 38, AR050: 26, AR051: 25, AR061: 2, AR089: 1 S0028: 1		
46	HNHCB32	861673	56	183 - 593	654	Lys-17 to Thr-23, His-95 to Thr-101.	AR051: 23, AR050: 14, AR061: 10, AR054: 4, AR089: 3 S0053: 1		
47	HPMFL08	1050684	57	191 - 391	655	Lys-17 to Thr-23, His-95 to Thr-101.	AR089: 1, AR061: 1 H0031: 2		
48	HTXRA13	959622	58	3 - 1091	656	Met-43 to Trp-52. Ser-1 to Ser-6, Thr-14 to Gly-28.	AR061: 1, AR089: 0 H0556: 2, L0756: 2, H0423: 2, S0134: 1, H0580: 1, H0271: 1, T0006: 1, H0264: 1, H0560: 1, H0641: 1, S0142: 1, L0805: 1, L0809: 1, L0789: 1, H0555: 1, L0780: 1 and S0031: 1.		
49	HCE3H71	1197898	59	410 - 988	657	His-14 to Gly-19,	AR089: 14, AR061: 10		



							Glu-126 to Tyr-132, Trp-161 to Arg-166. Pro-38 to Lys-43.	H0271: 2		
54	HFXDO83	576186	379	165 - 422	977			AR089: 1, AR061: 1 S0001: 3		
		1012602	64	12 - 608	662					
		578847	380	16 - 207	978					
55	HSDIW73	1104406	65	1 - 1068	663		Leu-4 to Pro-9, Ile-64 to Arg-69, Asn-142 to Pro-147, Pro-349 to Asp-356.	AR051: 4, AR054: 1, AR089: 1, AR061: 0, AR050: 0 S0046: 1, S0028: 1, S0031: 1 and S0260: 1.		
		587311	381	2 - 1075	979		Leu-6 to Pro-11, Ile-66 to Arg-71, Asn-144 to Pro-149, Pro-351 to Asp-358.			
		954821	382	1595 - 549	980		Ile-57 to Arg-62, Asn-135 to Pro-140, Pro-342 to Asp-349.			
56	HFVGD23	1199645	66	2 - 1003	664		Ser-4 to Arg-9, Glu-41 to Ser-53, Arg-67 to Ser-72, Asn-111 to Arg-122, Gly-212 to Arg-218, Gln-229 to Ser-235, Arg-239 to Lys-244.	AR089: 5, AR061: 3 S0250: 4, L0745: 2, H0393: 1, H0587: 1, L0744: 1, L0748: 1, L0439: 1 and L0752: 1.		
		676214	383	2 - 478	981		Ser-4 to Arg-9, Glu-41 to Ser-53, Arg-67 to Ser-72, Asn-111 to Arg-122.			
57	HMSBZ24	1082367	67	2 - 718	665		Lys-79 to Asp-87,	AR061: 4, AR089: 2		

58	HWHHB69	678707 1217042	384 68	2 - 322 3 - 2186	982 666	Lys-100 to Asp-106.  Thr-1 to Ser-10, Ala-73 to Tyr-80, Arg-133 to Ser-143, Gly-174 to His-179, Ser-201 to Arg-224, Asn-236 to Gly-241, Tyr-260 to Cys-272, Pro-274 to Thr-284, Gln-292 to Glu-306, Cys-409 to Arg-414, Arg-424 to Arg-432, Asp-523 to His-531, Thr-552 to Pro-557, Asn-601 to Pro-606, His-612 to His-618, Pro-678 to His-684, Asn-698 to Gln-705.	H0331: 1, S0002: 1, H0519: 1 and L0741: 1.  AR089: 1, AR061: 1 L0803: 3, S0354: 2, H0052: 2, H0617: 2, L0770: 2, L0646: 2, S0028: 2, L0753: 2, H0445: 2, H0556: 1, S6024: 1, H0657: 1, S0418: 1, S0420: 1, H0351: 1, H0441: 1, H0586: 1, H0013: 1, S0280: 1, H0156: 1, L0021: 1, H0122: 1, S0010: 1, H0571: 1, L0163: 1, H0135: 1, H0412: 1, H0100: 1, L0351: 1, L0769: 1, L0639: 1, L0764: 1, L0649: 1, L0659: 1, L0809: 1, L0530: 1, H0520: 1, H0547: 1, H0519: 1, H0690: 1, H0539: 1, S0136: 1, H0696: 1, L0748: 1, L0747: 1, L0756: 1, L0779: 1, L0757: 1, S0434: 1, S0436: 1, S0011: 1 and H0136: 1.		
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59	HFXLC69	690442	385	1 - 261	983	Gly-1 to Ser-7.	AR061: 1, AR089: 1 H0052: 2, H0135: 2, S0282: 1, H0254: 1, H0051: 1, H0634: 1, S0152: 1, H0436: 1 and H0677: 1.		
		1162543	69	16 - 939	667	Gly-49 to Gly-60, Arg-84 to Cys-97, Pro-100 to Gln-106, Ala-113 to Ala-137, Ala-145 to Trp-156, Ala-172 to Tyr-182, Asn-218 to Tyr-225.			
		692773	386	3 - 230	984				
60	HBXBW40	1156765	70	124 - 588	668	Ser-1 to Ser-12, Arg-33 to Arg-50, Tyr-117 to Leu-125.	AR089: 16, AR061: 8 S0038: 2, H0438: 1, S0049: 1 and H0547: 1.		
		706115	387	124 - 456	985	Gln-3 to Ser-12, Arg-33 to Arg-50, Ser-93 to Glu-98.			
61	HCE1L51	1140498	71	3 - 434	669		AR089: 4, AR061: 3 S0206: 2, H0052: 1, T0010: 1 and H0604: 1.		
		715899	388	3 - 434	986				
62	HRADM45	1148046	72	2 - 472	670	Lys-1 to Leu-6, Asp-25 to Pro-30.	AR089: 14, AR061: 6 H0555: 1 and L0777: 1.		
		717358	389	2 - 472	987	Lys-1 to Leu-6, Asp-25 to Pro-30.			
63	HTEFO45	1153918	73	61 - 597	671	Leu-59 to Thr-82, Lys-89 to Gly-94, Gln-155 to Val-161, Lys-169 to Ala-179.	AR061: 6, AR089: 3 L0758: 2, S0222: 1, H0038: 1 and H0539: 1.		
		723446	390	3 - 482	988	Gln-6 to Lys-14, Leu-68 to Glu-90.			

64	HOHBN82	1152271	74	2 - 1465	672	Asn-41 to Pro-50, Asp-60 to Glu-71, Leu-121 to Pro-130, Glu-139 to Thr-144, Asp-155 to Ser-166, Gly-174 to Leu-187, Pro-194 to Pro-199, Arg-211 to Asp-228, Gly-256 to Phe-270, Asp-334 to Gly-344, Gly-356 to Val-373, Glu-398 to Met-403, Asn-418 to Leu-424, Glu-444 to Trp-451, Cys-465 to Tyr-474.	AR089: 1, AR061: 0 S0002: 2, H0521: 2, S0360: 1, H0123: 1, S0250: 1, L0654: 1, S0152: 1, L0740: 1 and L0749: 1.		
		724322	391	3 - 629	989	Asn-41 to Pro-50, Asp-60 to Glu-71, Leu-121 to Pro-130, Glu-139 to Thr-144, Asp-155 to Ser-166, Gly-174 to Asp-188.			
65	HWHGF52	1217026	75	834 - 1	673	Lys-1 to Ala-6, Ser-38 to Gln-43, Pro-88 to Ala-112, Pro-141 to Asp-148, Gly-186 to Thr-200, Pro-231 to Ala-238, Leu-248 to Ser-254.	AR089: 1, AR061: 0 L0776: 5, L0764: 4, L0743: 4, L0740: 3, L0750: 3, L0777: 3, L0731: 3, S0001: 2, H0438: 2, H0052: 2, H0194: 2, H0201: 2, L0526: 2, H0144: 2, L0742: 2, H0662: 1,		

66	HBKDI30	726102	392	1 - 453	990	Gln-1 to Lys-8, Gly-10 to Trp-17, Val-28 to Gly-43, Thr-54 to Glu-63.	H0619: 1, H0261: 1, H0392: 1, H0455: 1, H0586: 1, H0587: 1, H0574: 1, H0486: 1, H0013: 1, H0427: 1, S0010: 1, S0346: 1, T0110: 1, H0009: 1, L0157: 1, H0320: 1, H0051: 1, T0006: 1, H0604: 1, H0163: 1, H0646: 1, L0763: 1, L0638: 1, L0630: 1, L0646: 1, L0773: 1, L0651: 1, L0523: 1, L0805: 1, L0666: 1, L0663: 1, L0664: 1, H0547: 1, H0660: 1, S0404: 1, L0744: 1, L0439: 1, L0752: 1, S0434: 1 and L0595: 1.	
		1223861	76	1115 - 321	674		AR089: 1, AR061: 0 S0364: 3, S0366: 3, L0604: 3, H0624: 1, L0622: 1, L0623: 1, H0041: 1, L0791: 1, S0380: 1 and L0748: 1.	

		729048	393	1 - 381	991	Gly-15 to Thr-21, Glu-76 to Lys-86.			
67	HSQFR54	1185143	77	1 - 1170	675	Ser-116 to Asp-125, Glu-183 to Ser-188, Arg-228 to Gln-234, Leu-280 to Lys-303.	AR061: 4, AR089: 2 H0650: 2, H0052: 2, H0547: 2, H0542: 2, S0212: 1, S0222: 1, T0114: 1, L0483: 1, H0628: 1, L0455: 1, H0413: 1, S0344: 1, L0766: 1, L0775: 1, L0805: 1, L0665: 1, H0520: 1, H0519: 1, S0126: 1, H0521: 1, S0044: 1, S0390: 1, L0592: 1 and S0026: 1.		
		730964	394	2 - 319	992	Glu-41 to Ser-46.			
68	HAGBA56	1102593	78	1 - 735	676	Pro-2 to Gly-10.	AR061: 2, AR089: 1 S0010: 1, H0135: 1, L0766: 1, L0745: 1, L0779: 1 and L0758: 1.		
		732597	395	115 - 633	993	Asp-52 to Leu-57, Lys-82 to Thr-87, Ser-90 to Trp-98, Ser-118 to Leu-123.			
69	HHSAE29	1220851	79	563 - 985	677	His-13 to Asn-24.	AR061: 2, AR089: 1 S0282: 1 and S0051: 1.		
		743166	396	2 - 325	994				
70	HMSHO64	746582	80	1 - 411	678	Ser-11 to Ser-21, Ser-84 to Ala-89, Pro-98 to Arg-107.	AR089: 2, AR061: 2 S0002: 2		



71	HFPBW22	1154786	81	762 - 376	679	Lys-1 to Ala-6, Ala-17 to Leu-25, Arg-54 to Ala-59, Val-61 to Arg-66, Ser-90 to Gly-95.	AR061: 4, AR089: 2 S0222: 1, S0280: 1, L0774: 1, L0376: 1 and S0378: 1.		
		750631	397	224 - 619	995				
72	HTLBH67	1224371	82	2886 - 2005	680	Lys-31 to Ala-48, Gln-51 to Thr-62, Gln-105 to Ser-110, Cys-126 to Leu-134, Gln-137 to Gly-150, His-174 to Ala-205, Arg-212 to Pro-220, Pro-227 to Gly-232, Gly-245 to Ala-251, Ala-257 to Ser-263, Leu-266 to His-283.	AR061: 2, AR089: 1 L0752: 3, L0747: 2, H0294: 1, H0253: 1, H0046: 1, H0040: 1, H0063: 1, H0494: 1, S0352: 1, L0769: 1, L0766: 1, L0804: 1, L0805: 1, L0791: 1, H0521: 1, L0779: 1, L0780: 1, L0731: 1 and L0758: 1.		
		751985	398	1 - 282	996				
73	HNTMH70	1143523	83	2 - 679	681	Pro-1 to Glu-6, His-17 to Lys-22, Pro-52 to Gln-58, Gly-123 to Arg-130, His-205 to Ala-210.	AR089: 0, AR061: 0 H0520: 1		
		757184	399	2 - 688	997	Pro-1 to Glu-6, His-17 to Lys-22, Pro-52 to Gln-58.			
74	HCETC59	1183334	84	105 - 326	682		AR089: 1, AR061: 1 H0052: 1 and H0194: 1.		
		761881	400	105 - 326	998				

75	HE8UX76	1161223	85	2 - 1237	683	Asp-8 to Ala-13, Ala-26 to Arg-33, Pro-38 to Ala-50, Pro-60 to Asn-65, Asp-68 to Ser-74, Arg-109 to Arg-132, Asp-140 to Leu-145, Ala-149 to Ser-154, Ile-158 to Asp-169, Glu-171 to Ala-177, Cys-213 to Pro-218, Pro-226 to Lys-231, Thr-244 to Phe-249, Arg-361 to Ile-370.	AR061: 1, AR089: 1 H0539: 4, L0439: 4, L0438: 2, H0013: 1, L0758: 1 and L0592: 1.		
		767871	401	214 - 798	999	Arg-39 to Arg-62, Asp-70 to Leu-75, Ala-79 to Ser-84, Ile-88 to Asp-99, Glu-101 to Ala-107.			
76	HTLEN77	1136124	86	3 - 947	684	His-1 to Thr-6, Arg-30 to Thr-35, Lys-40 to Ala-71, Pro-209 to Glu-222, Arg-231 to Tyr-237, Pro-239 to Tyr-245, Arg-263 to Ala-271, Gln-290 to Trp-306.	AR089: 33, AR061: 18 L0748: 2 and H0253: 1.		
		772363	402	90 - 422	1000	Ala-1 to Ala-35.			
77	HBGDI80	1124695	87	2 - 523	685	Asp-44 to Ile-50, Arg-121 to Leu-132,	AR061: 13, AR089: 5 L0805: 2, H0436: 2,		

						Lys-148 to Ser-160.				L0439: 2, L0362: 2, S0358: 1, L0483: 1, H0181: 1, S0422: 1, L0369: 1, L0804: 1, L0787: 1 and L0663: 1.		
		781600	403	1 - 429	1001	Asp-13 to Ile-19, Pro-37 to Arg-42.						
78	HELHB88	1225632	88	138 - 3230	686	Gln-1 to Thr-7, Glu-28 to Gln-35, Lys-188 to Lys-207, Ser-238 to Gly-245, Asp-278 to Gly-283, Pro-317 to Ser-324, Ser-335 to Glu-342, Pro-344 to Lys-355, Glu-362 to Asn-373, Glu-385 to Arg-393, Arg-399 to Gln-417, Lys-422 to Gln-457, Glu-461 to Glu-477, Leu-514 to Glu-529, Leu-538 to Met-548, Gln-562 to Gln-567, Asn-569 to Asp-574, Arg-594 to Gln-609, Asn-626 to Met-636, Ala-638 to Lys-649, Glu-654 to Gln-670, Gln-676 to Leu-716, Ser-736 to Gly-741,			AR061: 2, AR089: 2 L0777: 3, L0794: 2, S0027: 2, L0748: 2, L0747: 2, L0601: 2, S0342: 1, S0212: 1, S0282: 1, L0004: 1, S0045: 1, H0581: 1, T0110: 1, L0471: 1, S6028: 1, H0551: 1, H0494: 1, H0509: 1, L0646: 1, L0665: 1, H0520: 1, H0547: 1, S0390: 1, L0591: 1, L0366: 1 and H0653: 1.			



82	HGBDG55	1141363	92	26 - 535	690	Gly-1 to Ala-8, Phe-31 to Leu-36, Glu-54 to Lys-62, Gly-69 to Gly-75, Leu-100 to Gly-106, Ser-125 to Lys-131.	AR089: 1, AR061: 1 S0040: 1, H0014: 1, H0030: 1, H0063: 1, L0803: 1, H0521: 1 and S0028: 1.		
		815858	407	26 - 400	1005	Gly-1 to Ala-8, Phe-31 to Leu-36, Glu-54 to Lys-62, Gly-69 to Gly-75, Leu-100 to Gly-106.			
83	HOUHL51	1125914	93	2 - 508	691	Ala-12 to Trp-19, Ala-21 to Arg-27, Glu-38 to Phe-49, Arg-90 to Val-102, Glu-144 to Gly-151, Tyr-164 to Ala-169.	AR061: 6, AR089: 2 L0758: 6, L0794: 3, H0038: 2, L0768: 2, L0790: 2, L0731: 2, S0342: 1, H0664: 1, H0616: 1, S0210: 1, L0773: 1 and L0608: 1.		
		815891	408	3 - 527	1006				
84	HEOPP67	1020119	94	1 - 972	692	Asp-27 to Val-32, Asp-66 to Gly-71.	AR061: 1, AR089: 0 H0457: 2, H0650: 1 and H0622: 1.		
		827630	409	2 - 448	1007	Arg-8 to Arg-17, Asp-47 to Val-52, Asp-86 to Gly-91.			
85	HKAOV71	1165423	95	1 - 732	693		AR089: 6, AR061: 2 H0013: 2, H0046: 2, H0036: 1, H0590: 1, H0581: 1, H0551: 1 and H0494: 1.		

# TCF TO "S4873460"

86	HDQID90	827679	410	1 - 732	1008	Leu-12 to Gln-21.	AR089: 7, AR061: 3 L0766: 14, H0521: 4, L0748: 4, L0804: 3, L0776: 3, L0749: 3, L0731: 3, L0485: 3, S0376: 2, H0580: 2, L0483: 2, H0316: 2, S0002: 2, L0803: 2, L0775: 2, L0805: 2, L0659: 2, L0438: 2, H0265: 1, H0686: 1, H0656: 1, H0341: 1, S0212: 1, H0638: 1, H0125: 1, S0360: 1, H0411: 1, S0222: 1, H0409: 1, H0587: 1, H0014: 1, S0003: 1, H0163: 1, H0591: 1, H0488: 1, H0494: 1, H0641: 1, L0598: 1, H0529: 1, L0772: 1, L0764: 1, L0768: 1, L0774: 1, L0655: 1, L0783: 1, L0809: 1, L0792: 1, L0663: 1, L0665: 1, H0702: 1, H0519: 1, S0126: 1, H0682: 1, H0435: 1, H0672: 1, H0704: 1,
		1137752	96	2 - 361	694		

87	HFRBN81							S3012: 1, L0751: 1, L0750: 1, L0777: 1, L0752: 1, L0757: 1, L0758: 1, L0759: 1, L0362: 1, H0423: 1 and H0506: 1.		
		831976	411	221 - 724	1009			AR050: 10, AR051: 3, AR061: 1, AR089: 1, AR054: 0		
		1182552	97	2331 - 598	695			S0028: 4, S0001: 2, S0278: 2, S0050: 2, S0282: 1, H0632: 1, H0271: 1, H0416: 1, H0027: 1, S0038: 1, S0052: 1, S0053: 1, H0684: 1 and S0044: 1.		
		833061	412	1 - 1116	1010		Gly-113 to Gly-119, Gln-173 to Thr-181, Ala-362 to Pro-368.			
		973206	413	1 - 435	1011					
88	HFKJW01	973208	414	138 - 587	1012		Leu-51 to Ser-62.			
		1187134	98	487 - 8	696			AR089: 1, AR061: 0 H0620: 2, H0012: 1, S0152: 1 and S0260: 1.		
		836491	415	3 - 440	1013					
89	HSDFL63	1219300	99	2590 - 1844	697		Ser-83 to Lys-88, Pro-95 to Asn-112, Arg-180 to Asp-185, Met-231 to Arg-240.	AR061: 402, AR089: 142 H0038: 7, L0758: 5, H0616: 4, L0731: 4,		

								S0002: 3, L0637: 3, H0623: 2, L0794: 2, L0809: 2, L0663: 2, H0522: 2, L0779: 2, L0777: 2, S0046: 1, H0431: 1, T0060: 1, H0013: 1, S0010: 1, H0545: 1, H0050: 1, S0023: 1, S0003: 1, H0328: 1, H0135: 1, H0163: 1, H0412: 1, H0102: 1, H0100: 1, T0042: 1, L0768: 1, L0803: 1, L0375: 1, L0542: 1, L0647: 1, L0367: 1, L0791: 1, L0664: 1, H0693: 1, S0328: 1, S0168: 1, S0031: 1 and H0008: 1.		
90	HPJET90	836498	416	1 - 249	1014	Glu-1 to Asp-7, Met-53 to Met-60, Ile-78 to Ser-83.	AR061: 0, AR089: 0 S0152: 2			
91	HEMFC61	836503	100	39 - 377	698	His-8 to Gly-18, Leu-40 to Ile-45, Asn-100 to Asp-105.	AR061: 4, AR089: 3 H0038: 7, L0758: 5, H0616: 4, L0731: 4, S0002: 3, L0637: 3, H0623: 2, L0794: 2,			



									L0809: 2, L0663: 2, H0522: 2, L0779: 2, L0777: 2, S0046: 1, H0431: 1, T0060: 1, H0013: 1, S0010: 1, H0545: 1, H0050: 1, S0023: 1, S0003: 1, H0328: 1, H0135: 1, H0163: 1, H0412: 1, H0102: 1, H0100: 1, T0042: 1, L0768: 1, L0803: 1, L0375: 1, L0542: 1, L0647: 1, L0367: 1, L0791: 1, L0664: 1, H0693: 1, S0328: 1, S0168: 1, S0031: 1 and H0008: 1.			
92	HDTBR50	1174351	102	467 - 234	700	Thr-26 to Arg-31, Gly-73 to Trp-78.	AR089: 41, AR061: 4 H0486: 2					
		846630	417	130 - 342	1015	Ala-2 to Glu-7, Arg-50 to Glu-58.						
93	HACCH94	847143	103	1 - 897	701	Gly-1 to Ser-6, Arg-76 to Gln-88, Lys-113 to Ser-119, Tyr-125 to Lys-132, Ser-167 to Tyr-179, Arg-263 to Tyr-281, Ser-294 to Thr-299.	AR061: 4, AR089: 2 L0754: 6, L0766: 3, L0731: 2, H0624: 1, H0170: 1, S0116: 1, S0280: 1, H0545: 1, T0006: 1, S0344: 1, S0426: 1, L0770: 1, L0790: 1, L0748: 1, L0756: 1, L0779: 1,					

94	HE8TI39	1223481	104	441 - 1166	702	Thr-21 to Trp-26, Thr-72 to Val-88, Arg-115 to Tyr-127.	L0589: 1 and L0462: 1. AR061: 2, AR089: 2 L0438: 4, L0746: 4, H0581: 2, H0656: 1, H0013: 1, L0471: 1, H0266: 1, H0328: 1, H0553: 1, S0438: 1, H0529: 1, L0766: 1, L0805: 1, H0520: 1, H0521: 1, L0752: 1 and S0192: 1.		
		849161	418	3 - 470	1016	Ser-8 to Thr-15, Arg-73 to Thr-79, Phe-86 to Leu-92.			
		1140393	105	525 - 1	703		AR061: 6, AR089: 3 H0550: 1, H0494: 1 and L0659: 1.		
95	HEGAP32	851207	419	2 - 397	1017	Arg-1 to Thr-14.			
		853005	106	3 - 311	704		AR061: 1, AR089: 1 H0305: 1 and H0589: 1.		
96	HCWFU66								
97	HUSYI29	853149	107	3 - 470	705	Gln-57 to Ile-67, Asp-77 to Asp-85.	AR061: 5, AR089: 2 H0650: 2, H0052: 2, H0547: 2, H0542: 2, S0212: 1, S0222: 1, T0114: 1, L0483: 1, H0628: 1, L0455: 1, H0413: 1, S0344: 1, L0766: 1, L0775: 1, L0805: 1, L0665: 1,		

									H0520: 1, H0519: 1, S0126: 1, H0521: 1, S0044: 1, S0390: 1, L0592: 1 and S0026: 1.		
98	HMEFT66	1134131	108	82 - 933	706	Gly-61 to Glu-67, Ala-88 to Gly-96, Gly-127 to Trp-137.			AR061: 1, AR089: 1 H0175: 1, H0266: 1, H0292: 1, H0628: 1 and L0779: 1.		
		856149	420	2 - 349	1018						
99	HKAAR71	863023	109	54 - 977	707	Gln-1 to Gln-6, Ser-24 to Thr-31, Pro-57 to Gln-63, Ala-96 to Met-104, Asn-124 to Lys-133, Ser-172 to Trp-182, Ser-186 to Glu-194, Pro-286 to Pro-294.			AR061: 1, AR089: 0 H0494: 2, H0693: 2, H0521: 2, H0580: 1, H0253: 1, H0628: 1, H0522: 1 and H0422: 1.		
100	H7TBC95	865922	110	3 - 704	708	Gln-154 to Ser-163.			AR089: 1, AR061: 1 S0198: 57, S0274: 12, S0252: 4, S0270: 3, S0264: 1, S0268: 1 and S0228: 1.		
		908115	421	3 - 704	1019	Gln-154 to Ser-163.					
101	HAPPX52	637493	111	827 - 1222	709	Ser-59 to Ile-66, Arg-73 to Gly-85.			AR050: 16, AR054: 10, AR051: 5, AR061: 2, AR089: 1 H0305: 4, S0282: 1, H0575: 1, H0150: 1 and H0617: 1.		
		872075	422	3 - 359	1020						

102	HBGSJ13	872076	423	400 - 2	1021	His-73 to Phe-81, Thr-92 to Trp-102.	AR089: 1, AR061: 0 H0617: 2, H0013: 1, H0271: 1, L0455: 1 and H0539: 1.		
		1152326	112	1 - 756	710	Lys-1 to Lys-6, Gln-25 to Asp-36, Ser-85 to Ile-96, Val-115 to Ser-136, Lys-172 to Trp-177, Pro-188 to Phe-201, Gly-217 to Ala-224, Asn-230 to Gly-239.			
		878322	424	1 - 684	1022				
103	HFKLX38	880220	113	3 - 308	711		AR089: 1, AR061: 1 H0620: 2		
104	HTLGP15	1165362	114	196 - 786	712	Gly-2 to Thr-10, Glu-160 to Gly-175, Thr-189 to Glu-197.	AR089: 4, AR061: 3 T0010: 3, S0049: 2, H0052: 2, L0415: 1, H0618: 1 and S0010: 1.		
		880297	425	189 - 662	1023	Gly-2 to Thr-10, Glu-99 to Gly-104.			
105	HMEGH46	1092158	115	2 - 547	713	Asp-13 to Asp-19, Lys-76 to Asp-84.	AR054: 29, AR051: 12, AR061: 6, AR089: 3, AR050: 2 H0196: 1 and H0266: 1.		
		887791	426	1 - 315	1024	Asp-13 to Asp-19, Lys-76 to Asn-83.			
106	HE8PY29	1129488	116	2 - 277	714	Asp-28 to Ser-36, Glu-47 to Gln-60, Phe-68 to Gly-77, Pro-81 to Val-86.	AR061: 2, AR089: 1 H0013: 1 and S0126: 1.		

107	HTDAB17	890384	427	2 - 277	1025	Asp-28 to Ser-36, Glu-47 to Gln-60, Phe-68 to Gly-77, Pro-81 to Val-86. Asp-1 to Gly-14, Ala-60 to Lys-71, Gln-101 to Glu-118.	AR089: 1, AR061: 0 L0747: 28, L0588: 22, L0757: 19, H0251: 15, S0358: 14, S0045: 13, L0731: 12, H0551: 10, H0412: 10, L0771: 10, L0748: 9, L0758: 9, H0506: 9, H0556: 8, S0046: 8, H0622: 8, H0013: 7, H0623: 7, L0662: 7, S0192: 7, S0003: 6, L0659: 6, L0666: 6, S0328: 6, L0439: 6, L0750: 6, L0759: 6, L0599: 6, L0608: 6, S0040: 5, S0360: 5, H0581: 5, H0529: 5, L0763: 5, L0764: 5, L0664: 5, H0144: 5, S0026: 5, S0212: 4, H0486: 4, H0674: 4, L0776: 4, S0126: 4, H0672: 4, S0136: 4, L0752: 4, H0624: 3, S0420: 3, H0599: 3, H0004: 3,	6p24-p23	125264, 134570, 600511, 601556
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						H0266: 3, H0615: 3, H0031: 3, H0553: 3, H0591: 3, H0264: 3, H0413: 3, H0494: 3, S0210: 3, L0770: 3, L0806: 3, H0519: 3, H0435: 3, L0740: 3, L0751: 3, L0749: 3, H0170: 2, H0657: 2, H0656: 2, S0356: 2, S0408: 2, H0619: 2, H0393: 2, H0333: 2, T0040: 2, H0427: 2, S0280: 2, H0156: 2, H0318: 2, H0596: 2, T0110: 2, H0545: 2, H0046: 2, H0009: 2, H0050: 2, L0471: 2, H0188: 2, H0328: 2, H0428: 2, L0483: 2, H0644: 2, H0038: 2, S0426: 2, L0772: 2, L0646: 2, L0766: 2, L0649: 2, L0651: 2, L0655: 2, L0789: 2, L0663: 2, L0665: 2, L0352: 2, H0658: 2, S0152: 2, H0521: 2, H0696: 2, S0404: 2, H0555: 2, S0028: 2, H0445: 2, L0591: 2,	
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							L0594: 2, H0543: 2, H0422: 2, H0171: 1, H0265: 1, S6024: 1, H0295: 1, T0049: 1, S0134: 1, H0661: 1, H0663: 1, H0664: 1, S0418: 1, L0005: 1, S0354: 1, S0376: 1, S0468: 1, H0351: 1, S0220: 1, H0431: 1, H0392: 1, H0403: 1, H0592: 1, H0587: 1, H0642: 1, H0574: 1, H0485: 1, L0021: 1, H0575: 1, H0274: 1, S0346: 1, T0048: 1, S0049: 1, H0434: 1, H0230: 1, H0196: 1, H0052: 1, H0263: 1, H0597: 1, H0572: 1, H0012: 1, H0620: 1, T0003: 1, H0024: 1, H0057: 1, H0051: 1, H0083: 1, H0510: 1, H0687: 1, H0288: 1, S0022: 1, H0039: 1, H0030: 1, H0628: 1, H0166: 1, H0212: 1, H0135: 1, H0163: 1, H0090: 1, H0040: 1, H0634: 1, H0087: 1,	
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						H0477: 1, H0488: 1, H0433: 1, H0268: 1, H0269: 1, H0056: 1, S0038: 1, H0100: 1, H0429: 1, S0450: 1, H0132: 1, H0633: 1, S0472: 1, H0647: 1, H0646: 1, H0652: 1, S0344: 1, L0640: 1, L0371: 1, L0372: 1, L0374: 1, L0767: 1, L0768: 1, L0364: 1, L0794: 1, L0650: 1, L0375: 1, L0378: 1, L0606: 1, L0656: 1, L0783: 1, L0647: 1, S0374: 1, T0068: 1, L0438: 1, H0547: 1, H0689: 1, H0711: 1, H0684: 1, H0659: 1, H0670: 1, H0648: 1, S0330: 1, S0378: 1, S0380: 1, H0709: 1, S0146: 1, S3012: 1, S0037: 1, S0206: 1, L0742: 1, L0744: 1, L0755: 1, H0707: 1, S0434: 1, S0436: 1, L0584: 1, L0593: 1, L0362: 1, S0011: 1, S0424: 1 and H0293: 1.
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108	HCFCF47	1199931	118	1 - 780	716	Arg-8 to Glu-15, Gln-49 to Ala-58, Gly-175 to Gly-182, Arg-184 to Leu-191, Pro-198 to Phe-205.	AR089: 14, AR061: 7 H0341: 1 and H0422: 1.		
		894415	428	2 - 298	1026	Arg-1 to Glu-8.			
109	HDQHB19	1194798	119	2 - 709	717	Arg-1 to Thr-7, Pro-19 to Ala-25, Pro-56 to Leu-64, His-72 to Asn-81, Phe-184 to Pro-192, Pro-218 to Val-226, Ser-229 to Arg-236.	AR061: 3, AR089: 3 L0759: 12, L0439: 11, L0766: 7, L0775: 5, H0521: 5, L0755: 5, L0748: 4, L0756: 4, L0777: 4, L0731: 4, L0581: 4, L0619: 3, L0666: 3, L0779: 3, L0757: 3, L0588: 3, S0418: 2, L0618: 2, H0580: 2, L0055: 2, L0769: 2, L0773: 2, L0774: 2, L0791: 2, L0747: 2, L0750: 2, H0265: 1, H0663: 1, S0356: 1, H0208: 1, H0370: 1, H0108: 1, H0575: 1, H0618: 1, H0544: 1, H0545: 1, S0050: 1, H0510: 1, H0286: 1, H0031: 1, H0644: 1, H0068: 1, H0135: 1, L0564: 1, H0494: 1, L0475: 1,		

									H0396: 1, S0144: 1, S0002: 1, S0426: 1, L0763: 1, L0761: 1, L0642: 1, L0764: 1, L0662: 1, L0768: 1, L0806: 1, L0661: 1, L0659: 1, L0367: 1, L0663: 1, H0519: 1, H0435: 1, H0658: 1, S3014: 1, L0751: 1, L0749: 1, L0603: 1, H0665: 1 and H0542: 1.		
110	HAGDN53	895106	429	2 - 538	1027	Pro-14 to Ala-20, Pro-51 to Leu-59, His-67 to Thr-77.			AR050: 17, AR051: 11, AR054: 2, AR089: 1, AR061: 0 S0010: 1 and S0027: 1.		
		1129154	120	3 - 329	718	Gln-22 to Lys-30, Phe-40 to Tyr-49, Gln-70 to Trp-75, Arg-80 to Gln-87, Gly-95 to Arg-101.					
		895963	430	129 - 428	1028	Pro-9 to Gln-16, Phe-31 to Tyr-40, Gln-61 to Trp-66, Arg-71 to Gln-78, Gly-86 to Arg-92.					
111	HUFDB74	1162672	121	2 - 562	719	Gln-43 to Thr-58, Asn-74 to His-79, Gly-109 to Trp-114, Asp-136 to Phe-145.			AR061: 1, AR089: 1 H0575: 2, L0754: 2, H0599: 1, T0048: 1, L0163: 1, H0051: 1, H0188: 1, H0379: 1,		

Figure 1 consists of 11 subplots, labeled (a) through (k), each showing the relationship between a specific parameter and the maximum value of the function. The y-axis for all plots represents the 'Maximum value of the function'.

- (a) Number of iterations: The maximum value decreases as the number of iterations increases from 100 to 1000.
- (b) Number of nodes: The maximum value increases as the number of nodes increases from 10 to 100.
- (c) Number of layers: The maximum value increases as the number of layers increases from 1 to 10.
- (d) Number of hidden nodes: The maximum value increases as the number of hidden nodes increases from 10 to 100.
- (e) Number of hidden layers: The maximum value increases as the number of hidden layers increases from 1 to 10.
- (f) Number of output nodes: The maximum value increases as the number of output nodes increases from 10 to 100.
- (g) Number of output layers: The maximum value increases as the number of output layers increases from 1 to 10.
- (h) Number of input nodes: The maximum value increases as the number of input nodes increases from 10 to 100.
- (i) Number of input layers: The maximum value increases as the number of input layers increases from 1 to 10.
- (j) Number of hidden nodes: The maximum value increases as the number of hidden nodes increases from 10 to 100.
- (k) Number of hidden layers: The maximum value increases as the number of hidden layers increases from 1 to 10.

112	HNHFH24	901451	431	2 - 412	1029	Gln-43 to Thr-58, Asn-74 to His-79, Gly-109 to Trp-114.	L0438: 1, H0670: 1, H0672: 1, L0439: 1, L0747: 1, S0260: 1, L0591: 1 and H0506: 1.		
		1092567	122	28 - 516	720	His-8 to Gly-18, Ala-39 to Gly-45, Pro-94 to Glu-101, Pro-134 to Gly-142.	AR054: 20, AR050: 15, AR061: 7, AR089: 4, AR051: 1 S0053: 1		
		903741	432	28 - 480	1030	His-8 to Gly-18, Ala-39 to Gly-45, Pro-94 to Glu-101.			
113	HBGQT03	1188175	123	11 - 790	721	Glu-1 to Ala-12, Glu-19 to Val-28, Glu-34 to Thr-45, Leu-140 to Asp-157, Thr-167 to Ala-198, Ala-211 to Asp-216.	AR061: 6, AR089: 3 H0617: 10, L0665: 4, H0333: 3, S0366: 3, L0759: 3, H0599: 2, L0648: 2, L0653: 2, L0664: 2, H0519: 2, H0686: 1, H0484: 1, H0664: 1, H0392: 1, L0622: 1, S0280: 1, H0545: 1, T0010: 1, H0424: 1, H0031: 1, H0181: 1, H0708: 1, H0494: 1, H0633: 1, L0371: 1, L0764: 1, L0773: 1, L0768: 1, L0375: 1, L0651: 1,		

Figure 1 consists of 11 bar charts, each representing a different demographic or attitudinal variable. Each chart has two bars: a solid black bar representing the percentage of respondents and a white bar with a black outline representing the percentage of the total population. The variables and their corresponding percentages are as follows:

Variable	Percentage of Respondents	Percentage of Total Population
Age of Respondent	18.0%	18.0%
Sex	50.0%	50.0%
Education	10.0%	10.0%
Income	10.0%	10.0%
Marital Status	10.0%	10.0%
Religion	10.0%	10.0%
Political Party	10.0%	10.0%
Race	10.0%	10.0%
Ethnicity	10.0%	10.0%
Country of Birth	10.0%	10.0%
Country of Residence	10.0%	10.0%

114	HETLF29	908173	433	3 - 791	1031	Lys-1 to Ala-15, Glu-22 to Val-31, Glu-37 to Thr-48, Leu-143 to Asp-160, Thr-170 to Ala-201, Ala-214 to Asp-219.	L0659: 1, L0783: 1, L0789: 1, L0438: 1, H0684: 1, H0670: 1, L0744: 1, L0780: 1, L0755: 1 and L0595: 1.		
		1103959	124	3 - 482	722	Asp-119 to Tyr-124.	AR061: 4, AR089: 2 H0046: 1 and L0758: 1.		
115	HOUGD29	909762	434	3 - 416	1032				
		1204931	125	199 - 1821	723	Arg-9 to Gln-17, Ile-33 to Asn-39, Gln-93 to Ser-104, Asp-141 to Leu-155, Ser-224 to Asn-234, Asn-243 to Lys-248, Ser-308 to Gln-320, Thr-350 to Glu-357, Ser-384 to Thr-390, Asp-435 to Ser-447, Ala-480 to Lys-487, Lys-496 to Leu-508, Ser-519 to Val-528, Ser-533 to Gln-541.	AR061: 6, AR089: 5 L0770: 4, L0789: 3, L0439: 3, L0750: 3, L0641: 2, L0747: 2, L0758: 2, S0040: 1, H0575: 1, T0010: 1, H0087: 1, S0422: 1, L0803: 1, L0375: 1, L0776: 1, L0659: 1, L0783: 1, H0144: 1, L0352: 1, H0684: 1, H0660: 1, S0027: 1, L0777: 1 and H0445: 1.		
		909797	435	199 - 909	1033	Arg-9 to Leu-15.			

116	HTEMV09	1128254	126	1 - 711	724	Asp-22 to Asp-28, Leu-98 to Trp-103, Glu-123 to Trp-154, Pro-158 to Gln-178, Pro-180 to Met-189, Glu-207 to Lys-226, Ser-231 to Leu-237.	AR089: 13, AR061: 13 L0666: 3, L0758: 3, H0616: 2, L0779: 2, S0036: 1, L0598: 1, L0766: 1, L0651: 1, L0806: 1, L0776: 1, H0144: 1, H0547: 1, H0672: 1 and H0555: 1.		
117	HNTNB14	909843	436	1 - 711	1034	Asp-22 to Asp-28, Leu-98 to Trp-103, Glu-123 to Trp-154.	AR089: 1, AR061: 1 S0007: 1, S0222: 1, S0049: 1, L0438: 1, H0520: 1 and L0439: 1.		
		1128964	127	3 - 614	725	Phe-2 to Gln-9, Arg-22 to Val-29, Glu-51 to Leu-64, Tyr-73 to Ile-83, Glu-98 to Thr-104, Ala-119 to Asp-126, Arg-155 to Ser-161.			
		909942	437	2 - 658	1035	Ala-2 to Gln-9, Arg-22 to Val-29, Glu-51 to Leu-64.			
118	HE2KZ07	1149808	128	708 - 166	726		AR061: 9, AR089: 4 H0624: 1		
		909948	438	2 - 796	1036	Leu-10 to Gly-16, Pro-37 to Glu-45, Glu-78 to Cys-87.			
119	HSIGN57	1105444	129	3 - 974	727	Val-10 to Gly-16, Met-19 to Val-34, Ala-84 to Asp-90, Met-107 to Trp-120,	AR061: 2, AR089: 1 H0229: 1, H0590: 1, S0049: 1, H0014: 1, H0560: 1, L0439: 1 and		

120	HLHBC30						Gln-191 to Ala-201, Glu-223 to Val-229, Asn-309 to Gly-314.	H0543: 1.		
		910078	439	2 - 760	1037		Val-10 to Gly-16, Met-19 to Val-34.			
		1106654	130	39 - 512	728		Gln-7 to Glu-17, Thr-36 to Asn-42, Val-44 to Phe-49, Tyr-76 to Ile-85, Cys-94 to Glu-99, Pro-105 to Ser-110.	AR061: 8, AR089: 5 L0456: 3, H0024: 2 and L0747: 1.		
121	HFBDJ13	910079	440	39 - 512	1038		Gln-7 to Glu-17.			
		1195217	131	172 - 1368	729		Ser-45 to Glu-53, Ile-78 to Asn-94, Leu-99 to Ser-104, Ser-110 to Trp-128, Tyr-145 to Gly-153, Gln-168 to Trp-173, Leu-196 to Ala-205.	S0007: 2, L0794: 2, S0434: 2, S0354: 1, N0006: 1, H0622: 1 and H0478: 1.		
		911264	441	3 - 410	1039		Ser-6 to Trp-24.			
122	HTPGG25	1217208	132	786 - 1628	730		Glu-29 to Arg-35, Arg-50 to Leu-55, Leu-60 to Ser-69, Lys-102 to Asp-108, Pro-227 to Glu-233, Leu-249 to Glu-261.	AR061: 2, AR089: 2 L0439: 6, L0777: 6, H0052: 4, L0748: 4, H0634: 3, L0662: 3, L0805: 3, L0659: 3, L0438: 3, H0547: 3, L0750: 3, L0758: 3, H0208: 2, H0123: 2, H0014: 2, H0617: 2, H0135: 2, L0769: 2,		

L0766: 2, L0803: 2,  
 L0776: 2, L0666: 2,  
 L0751: 2, L0745: 2,  
 L0731: 2, H0265: 1,  
 S0408: 1, H0549: 1,  
 H0497: 1, L0622: 1,  
 H0581: 1, H0194: 1,  
 L0738: 1, H0546: 1,  
 H0024: 1, S0362: 1,  
 L0163: 1, T0010: 1,  
 H0083: 1, H0510: 1,  
 H0266: 1, H0428: 1,  
 H0622: 1, H0673: 1,  
 H0598: 1, S0036: 1,  
 H0163: 1, H0413: 1,  
 L0370: 1, T0041: 1,  
 H0647: 1, L0637: 1,  
 L0667: 1, L0772: 1,  
 L0646: 1, L0800: 1,  
 L0764: 1, L0649: 1,  
 L0657: 1, L0809: 1,  
 L0788: 1, L0663: 1,  
 S0374: 1, H0520: 1,  
 H0670: 1, H0666: 1,  
 S0330: 1, H0539: 1,  
 H0521: 1, H0696: 1,  
 H0478: 1, S0028: 1,  
 L0741: 1, L0747: 1,  
 L0749: 1, L0780: 1,  
 L0752: 1 and H0543: 1.

123	HSSMT34	911282	442	3 - 392	1040	Pro-3 to Arg-8.	AR061: 4, AR089: 3 L0439: 6, L0777: 6, H0052: 4, L0748: 4, H0634: 3, L0662: 3, L0805: 3, L0659: 3, L0438: 3, H0547: 3, L0750: 3, L0758: 3, H0208: 2, H0123: 2, H0014: 2, H0617: 2, H0135: 2, L0769: 2, L0766: 2, L0803: 2, L0776: 2, L0666: 2, L0751: 2, L0745: 2, L0731: 2, H0265: 1, S0408: 1, H0549: 1, H0497: 1, L0622: 1, H0581: 1, H0194: 1, L0738: 1, H0546: 1, H0024: 1, S0362: 1, L0163: 1, T0010: 1, H0083: 1, H0510: 1, H0266: 1, H0428: 1, H0622: 1, H0673: 1, H0598: 1, S0036: 1, H0163: 1, H0413: 1, L0370: 1, T0041: 1, H0647: 1, L0637: 1, L0667: 1, L0772: 1, L0646: 1, L0800: 1,		
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Figure 1 consists of 11 subplots, labeled (a) through (k), each showing the percentage of total catch (Y-axis, 0 to 100) versus time of day (X-axis, 0000 to 2400 hours). The data is presented as a line graph with error bars representing standard error.

- (a) Yellow perch: Catch peaks around 0600 and 1800 hours.
- (b) Rock bass: Catch peaks around 0600 and 1800 hours.
- (c) Striped bass: Catch peaks around 0600 and 1800 hours.
- (d) White perch: Catch peaks around 0600 and 1800 hours.
- (e) Atlantic croaker: Catch peaks around 0600 and 1800 hours.
- (f) Atlantic silverside: Catch peaks around 0600 and 1800 hours.
- (g) Atlantic menhaden: Catch peaks around 0600 and 1800 hours.
- (h) Atlantic herring: Catch peaks around 0600 and 1800 hours.
- (i) Atlantic bluefish: Catch peaks around 0600 and 1800 hours.
- (j) Atlantic tomcod: Catch peaks around 0600 and 1800 hours.
- (k) Atlantic sea herring: Catch peaks around 0600 and 1800 hours.

124	HWWDN34	1152430	134	2 - 1012	732	Ser-15 to Leu-21, Pro-24 to Val-30, Ser-91 to Lys-99, Thr-113 to Lys-120, Pro-168 to Gln-174, Glu-226 to Ser-231, Ser-296 to Gln-307, Asp-319 to Gly-328, Gly-330 to Ala-337.	L0764: 1, L0649: 1, L0657: 1, L0809: 1, L0788: 1, L0663: 1, S0374: 1, H0520: 1, H0670: 1, H0666: 1, S0330: 1, H0539: 1, H0521: 1, H0696: 1, H0478: 1, S0028: 1, L0741: 1, L0747: 1, L0749: 1, L0780: 1, L0752: 1 and H0543: 1.		
						Ser-11 to Leu-17, Pro-20 to Val-26, Ser-87 to Lys-95, Thr-109 to Lys-116, Pro-164 to Gln-170,	AR089: 1, AR061: 1 S0354: 16, H0457: 7, L0758: 3, H0555: 2, H0170: 1, H0657: 1, H0255: 1, H0662: 1, S0360: 1, H0036: 1, H0150: 1, H0051: 1, H0553: 1, L0800: 1, L0644: 1, L0771: 1, L0803: 1, L0787: 1, L0663: 1, H0144: 1, S0374: 1, H0670: 1, H0522: 1, L0749: 1, S0452: 1 and H0506: 1.		
		911357	443	2 - 1000	1041				

125	HCEPW85	911374	135	3 - 314	733	Glu-222 to Ser-227, Ser-292 to Gln-303, Asp-315 to Gly-324, Gly-326 to Ala-333. Thr-2 to Gln-7.	H0052: 1 and L0471: 1.		
126	HMTAW83	1071602	136	1 - 363	734	Ile-26 to Trp-33, Glu-52 to Leu-71.	AR089: 0, AR061: 0 H0583: 1, H0644: 1, L0766: 1 and H0518: 1.		
		911385	444	1 - 363	1042	Ile-26 to Trp-33, Glu-52 to Leu-71.			
127	HDMAV01	1194697	137	1 - 657	735	Pro-1 to Glu-15, Ala-26 to Lys-32, Glu-46 to Leu-65, Arg-82 to Cys-94, Leu-101 to Glu-107, Leu-146 to Asp-151, Gln-157 to Ser-162, Ser-165 to Ala-187, Phe-210 to Leu-217.	AR089: 2, AR061: 2 L0766: 5, L0776: 5, L0754: 4, H0013: 3, S0126: 3, L0742: 3, L0750: 3, H0624: 2, S0360: 2, H0560: 2, L0769: 2, L0641: 2, L0665: 2, S0330: 2, L0756: 2, L0731: 2, L0759: 2, L0588: 2, H0171: 1, H0650: 1, H0402: 1, H0638: 1, H0340: 1, H0637: 1, H0351: 1, S0222: 1, H0581: 1, H0263: 1, H0545: 1, H0050: 1, S0051: 1, S0214: 1, H0039: 1, L0055: 1, H0090: 1, H0412: 1,		

									H0022: 1, H0359: 1, H0561: 1, H0641: 1, L0770: 1, L0637: 1, L0646: 1, L0764: 1, L0773: 1, L0662: 1, L0768: 1, L0651: 1, L0653: 1, L0659: 1, L0792: 1, H0519: 1, H0522: 1, H0576: 1, S0028: 1, L0439: 1, L0740: 1, L0749: 1, L0777: 1, H0444: 1, L0596: 1, L0601: 1, H0542: 1 and H0543: 1.		
128	HDPSR74	911386	445	3 - 428	1043	Asp-1 to Glu-11, Ala-22 to Lys-28, Glu-42 to Leu-61, Arg-78 to Cys-90, Leu-97 to Glu-103.			AR050: 48, AR054: 42, AR051: 35, AR089: 3, AR061: 1 H0575: 2, H0580: 1, S0002: 1, S0426: 1, H0521: 1, H0436: 1 and L0748: 1.		
129	HHEZT58	1160657	139	1212 - 937	737	Pro-4 to His-21, Glu-35 to Gln-43.			AR089: 8, AR061: 3 L0794: 3, L0758: 2, L0759: 2, H0624: 1, L0717: 1, T0082: 1,		

									H0581: 1, H0553: 1, H0038: 1, T0067: 1, L0665: 1, H0436: 1, L0439: 1, L0745: 1 and H0543: 1.			
		911416	446	1 - 558	1044	Glu-9 to Lys-14, Gln-51 to Gln-57.						
130	HTLDU05	911649	140	2 - 469	738	Pro-89 to Ala-97.			AR061: 8, AR089: 7 H0253: 3, H0618: 1 and L0758: 1.	9q31	109400, 132800, 132800, 186855, 223900, 253800, 253800, 278700, 602088	
131	HTLET56	1189721	141	144 - 1211	739	Ser-54 to Lys-61, Pro-118 to Lys-128, Pro-233 to Val-244, Leu-262 to Ser-270, Ser-322 to Gly-344, Pro-347 to Ser-353.			AR061: 6, AR089: 5 H0253: 18, H0618: 7, L0794: 3, H0038: 1, H0616: 1, L0788: 1 and L0758: 1.			
		911654	447	95 - 826	1045	Ser-54 to Lys-61, Pro-118 to Lys-128, Thr-208 to Ser-213, Ser-218 to Ala-227, Pro-230 to Ser-236, Pro-238 to Ser-244.						
132	HTLCA95	911655	142	38 - 1096	740				AR061: 373, AR089: 188			

133	HTEJT86	1090517	143	1 - 1119	741	Ala-39 to Ala-45, Gln-57 to Ser-63, Tyr-90 to Lys-95, Leu-113 to Ile-119.	H0253: 3, H0618: 2, H0038: 2, H0616: 1 and L0758: 1.		
						AR089: 1, AR061: 1 L0794: 3, H0038: 2, H0265: 1, S0358: 1, T0039: 1, H0616: 1, L0768: 1, L0804: 1, L0664: 1, L0777: 1, L0731: 1, L0758: 1 and L0465: 1.			
134	HTEMA54	1134919	144	22 - 1359	742	Gly-23 to Asn-30, Thr-58 to Val-79, Arg-101 to Ile-106, Thr-117 to Glu-126, Pro-184 to Lys-193, Ile-298 to Val-303, Phe-381 to Leu-389.	AR089: 19, AR061: 13 H0618: 14, H0253: 12, H0038: 11, H0616: 2, L0794: 1, L0779: 1 and L0758: 1.		
		911666	449	22 - 1167	1047	Gly-23 to Asn-30, Arg-45 to Lys-50.			
135	HTLGJ17	1135518	145	216 - 587	743	Gly-35 to Ser-44.	AR089: 18, AR061: 5 H0618: 5, H0549: 1 and H0543: 1.		
		915136	450	93 - 464	1048	Val-6 to Arg-12.			
136	HOUES64	918119	146	3 - 317	744	Pro-89 to Leu-102.	AR061: 1, AR089: 0 S0040: 1 and S0278: 1.		
137	HMSCD15	982250	147	507 - 1	745	Asp-16 to Gln-22,	AR089: 1, AR061: 1		

						Val-44 to Ser-57.				S0002: 2 and L0766: 1.		
138	HDQDX20	918133	451	237 - 635	1049					AR089: 30, AR061: 4 H0521: 3, H0051: 2, L0756: 2, H0590: 1, S0250: 1, L0772: 1, H0522: 1, S0406: 1 and L0748: 1.		
		1223474	148	228 - 1715	746	Met-7 to Ser-12, Ser-20 to Arg-30, Asp-85 to Ala-92, Met-119 to Asn-146, Pro-151 to Asp-161, Gln-253 to Glu-260, Ile-333 to Val-342, Leu-396 to Ala-406.						
		919027	452	210 - 1037	1050	Met-7 to Ser-12, Ser-20 to Arg-30, Asp-85 to Ala-92, Met-119 to Asn-146, Pro-151 to Asp-161.						
139	HLTHP86	1110457	149	3 - 1352	747	His-35 to Glu-44, Lys-88 to Tyr-94, Asp-140 to Ser-152, Leu-166 to Lys-171, Glu-183 to Glu-197, Glu-210 to Leu-217, Pro-231 to Gln-236.				AR089: 1, AR061: 1 L0439: 3, L0438: 2, S0028: 2, H0656: 1, H0645: 1, H0369: 1, S0222: 1, S0346: 1, H0328: 1, H0029: 1, H0644: 1, H0169: 1, H0591: 1, H0646: 1, H0520: 1, H0539: 1, L0746: 1 and L0366: 1.		
140	HMSOL52	919354	453	3 - 1310	1051					AR061: 5, AR089: 2 L0770: 4, L0803: 4, H0638: 1, H0123: 1, S0426: 1, L0662: 1,		
		1182715	150	1146 - 832	748	Ser-1 to Gly-12, Arg-30 to Pro-36, Thr-65 to Met-76, Pro-86 to Asp-95.						

# TABLE "S2849260"

									H0648: 1, L0747: 1, L0756: 1, L0779: 1, L0752: 1 and L0759: 1.			
	921126	454	90 - 473	1052					Glu-29 to Gly-35, Arg-53 to Pro-59, Thr-88 to Met-99, Pro-109 to Asp-118.			
141	HAHGD33	1219819	151	3 - 1745	749				Gly-59 to Ser-68, Ala-87 to Glu-98, Pro-106 to Asn-121, Ser-148 to Lys-159, Phe-207 to Ala-222, Cys-279 to Asn-285, Gly-322 to Pro-330, Glu-357 to Ala-364, Ile-402 to Asp-407, Pro-456 to Val-466, Ser-474 to Thr-487.	AR061: 7, AR089: 5 H0039: 5, H0622: 5, L0748: 4, H0667: 4, H0255: 3, S0126: 3, H0393: 2, S0278: 2, H0599: 2, H0618: 2, H0318: 2, H0123: 2, H0050: 2, H0179: 2, H0271: 2, S0036: 2, H0135: 2, H0634: 2, H0087: 2, H0100: 2, H0633: 2, S0210: 2, S0002: 2, H0144: 2, L0438: 2, L0602: 2, L0744: 2, L0731: 2, L0595: 2, L0601: 2, H0665: 2, H0542: 2, H0556: 1, H0222: 1, H0294: 1, H0583: 1, H0650: 1, H0657: 1, H0484: 1, H0306: 1, S0418: 1, S0420: 1, S0354: 1, H0580: 1,		





142	HHEHC53	921783	152	3 - 908	750	Cys-94 to Asn-100, Gly-137 to Pro-145, Glu-172 to Ala-179, Ile-217 to Asp-222.  Gly-59 to Ser-68, Ala-87 to Glu-98, Pro-106 to Asn-121, Ser-148 to Lys-159, Phe-207 to Ala-222, Ile-284 to Lys-289.	AR089: 3, AR061: 2 L0748: 8, H0039: 5, H0622: 5, L0664: 5, L0439: 5, L0779: 5, L0731: 5, L0758: 5, L0665: 4, L0744: 4, L0601: 4, H0667: 4, H0255: 3, H0618: 3, L0666: 3, L0438: 3, S0126: 3, L0602: 3, L0742: 3, L0604: 3, L0595: 3, H0542: 3, H0265: 2, S0358: 2, H0393: 2, S0278: 2, H0550: 2, H0333: 2, H0599: 2, H0318: 2, H0545: 2, H0123: 2, H0050: 2, H0620: 2, H0179: 2, H0271: 2, S0036: 2, H0135: 2, H0634: 2, H0087: 2, H0100: 2, H0633: 2, S0210: 2, S0002: 2, L0769: 2, L0646: 2, L0768: 2, L0774: 2, H0144: 2, L0565: 2,	2	19p	
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					H0689: 2, S0027: 2, L0747: 2, L0755: 2, L0593: 2, H0665: 2, H0556: 1, T0002: 1, H0222: 1, H0685: 1, H0294: 1, S0430: 1, H0583: 1, H0650: 1, H0657: 1, S0212: 1, S0282: 1, H0484: 1, H0306: 1, S0418: 1, S0420: 1, S0354: 1, S0360: 1, H0580: 1, S0007: 1, S0046: 1, H0619: 1, H0351: 1, H0549: 1, H0392: 1, H0586: 1, H0486: 1, T0060: 1, L0022: 1, H0122: 1, H0196: 1, H0597: 1, H0544: 1, H0009: 1, H0172: 1, L0471: 1, H0023: 1, H0071: 1, H0266: 1, H0290: 1, S0022: 1, H0030: 1, H0553: 1, H0628: 1, H0182: 1, H0617: 1, H0606: 1, H0551: 1, H0413: 1, H0056: 1, H0623: 1, S0038: 1, H0494: 1, H0625: 1, H0561: 1, H0386: 1, H0509: 1,		
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									H0131: 1, H0130: 1, H0646: 1, S0144: 1, S0344: 1, S0426: 1, H0529: 1, L0763: 1, L0770: 1, L0637: 1, L0372: 1, L0662: 1, L0775: 1, L0776: 1, L0659: 1, L0383: 1, L0790: 1, H0547: 1, H0435: 1, H0658: 1, H0670: 1, S0330: 1, H0521: 1, H0436: 1, S0390: 1, S0028: 1, S0032: 1, L0750: 1, L0753: 1, L0757: 1, L0759: 1, S0260: 1, H0445: 1, H0595: 1, L0597: 1, L0366: 1, H0668: 1, S0242: 1, H0423: 1, H0422: 1 and H0352: 1.					
143	HE2PB01	1206665	153	695 - 1228	751	Arg-1 to Asn-12, Leu-87 to Gln-92, Phe-111 to Ser-117, Arg-161 to Gly-168.	AR061: 9, AR089: 6 L0754: 6, H0318: 3, H0486: 2, H0013: 2, H0014: 2, L0439: 2, L0777: 2, H0543: 2, H0171: 1, H0556: 1, S6024: 1, H0583: 1, H0650: 1, H0638: 1, S0354: 1, H0580: 1,							

144	HOUDP52	1219522	154	3 - 1361	752	Glu-1 to Gly-7, Gln-43 to Arg-50, Asp-60 to Gly-67, Phe-150 to Glu-156, Arg-176 to Lys-181.	921850	456	2 - 691	1054	H0619: 1, H0455: 1, H0009: 1, S0003: 1, L0483: 1, S0036: 1, H0591: 1, H0494: 1, S0014: 1, S0450: 1, L0520: 1, L0763: 1, L0769: 1, L0641: 1, L0521: 1, L0662: 1, L0803: 1, L0774: 1, L0776: 1, L0783: 1, L0663: 1, H0144: 1, H0520: 1, H0547: 1, H0519: 1, S0136: 1, H0521: 1, H0522: 1, H0478: 1, L0742: 1, L0780: 1, L0592: 1, S0011: 1, S0192: 1, S0424: 1 and H0506: 1.		
						Lys-54 to Arg-60.					AR061: 2, AR089: 1 L0794: 7, L0743: 2, H0543: 2, S0040: 1, S0134: 1, S0356: 1, T0082: 1, H0251: 1, H0494: 1, H0625: 1, H0649: 1, L0806: 1,		

							L0657: 1, L0565: 1, L0758: 1, L0608: 1 and S0026: 1.		
145	HHGAE47	922102	457	196 - 1104	1055		Gly-1 to Arg-19, Asp-27 to Glu-34, Asp-40 to Lys-46, Pro-63 to Arg-70, Lys-97 to Lys-103, Asp-113 to Gly-118, Ala-148 to Tyr-158.	AR061: 3, AR089: 2 L0769: 5, L0774: 5, L0756: 4, H0624: 2, S0358: 2, S0444: 2, S0408: 2, H0587: 2, L0764: 2, L0766: 2, L0775: 2, L0601: 2, H0170: 1, S0442: 1, S0410: 1, H0497: 1, H0333: 1, H0632: 1, H0156: 1, L0022: 1, L0738: 1, H0271: 1, H0039: 1, S0344: 1, L0637: 1, L0772: 1, L0646: 1, L0773: 1, L0662: 1, L0518: 1, L0783: 1, L0791: 1, L0663: 1, S0374: 1, H0593: 1, H0660: 1, H0648: 1, H0672: 1, H0696: 1, L0749: 1, L0750: 1, L0779: 1, L0752: 1, L0755: 1, L0599: 1 and H0667: 1.	
		922194	458	3 - 503	1056	Gly-25 to Arg-45, Asp-53 to Glu-60,			

146	HMCGL45	1165349	156	89 - 922	754	Asp-66 to Lys-72, Arg-89 to Trp-106, Asn-121 to Gly-147, Val-152 to Gly-159, Ala-161 to Ser-166. Glu-8 to Pro-16, Gln-21 to Glu-26, Gly-105 to Arg-125, Asp-133 to Glu-140, Asp-146 to Lys-152, Pro-169 to Arg-176, Lys-203 to Lys-209, Asp-219 to Gly-224, Ala-254 to Tyr-264.	AR061: 8, AR089: 5 L0769: 5, L0774: 5, L0756: 4, H0624: 2, S0358: 2, S0444: 2, S0408: 2, H0587: 2, L0764: 2, L0766: 2, L0775: 2, L0601: 2, H0170: 1, S0442: 1, S0410: 1, H0497: 1, H0333: 1, H0632: 1, H0156: 1, L0022: 1, L0738: 1, H0271: 1, H0039: 1, S0344: 1, L0637: 1, L0772: 1, L0646: 1, L0773: 1, L0662: 1, L0518: 1, L0783: 1, L0791: 1, L0663: 1, S0374: 1, H0593: 1, H0660: 1, H0648: 1, H0672: 1, H0696: 1, L0749: 1, L0750: 1, L0779: 1, L0752: 1, L0755: 1, L0599: 1 and H0667: 1.		
		922195	459	442 - 885	1057	Gln-1 to Glu-10.			

147	HELEF11	1153884	157	1310 - 501	755	Asp-16 to Lys-22, Pro-39 to Arg-46, Lys-73 to Lys-79, Asp-89 to Gly-94, Ala-124 to Tyr-134.	AR061: 1, AR089: 1 S0045: 1 and H0457: 1.		
148	HETJX04	926930	460	53 - 625	1058	Ser-29 to Val-36, Leu-217 to Ser-222, Lys-255 to Ile-262.	AR089: 4, AR061: 2 H0046: 1, H0032: 1, H0040: 1 and L0565: 1.		
		1212235	158	3 - 704	756	Asp-11 to Val-21, Pro-27 to Thr-43, Trp-92 to Lys-97, Pro-136 to Gly-149, Met-182 to Val-193, Thr-197 to Asn-203.			
		927120	461	3 - 704	1059	Asp-11 to Val-21, Pro-27 to Thr-43, Trp-92 to Lys-97, Pro-136 to Gly-149, Met-182 to Val-193, Thr-197 to Asn-203.			
149	HSOBC04	1165357	159	3 - 395	757	Asn-61 to Glu-70, Ser-80 to Arg-85, Pro-88 to Ile-96, Gln-101 to Gly-109, Lys-117 to His-128.	AR061: 5, AR089: 2 L0747: 14, H0551: 9, H0617: 7, S0022: 6, H0135: 6, S3014: 6, L0750: 6, L0757: 6, L0759: 6, H0545: 5, S0126: 5, H0124: 4, H0529: 4, L0769: 4, L0764: 4, L0665: 4,		


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									L0770: 1, L0639: 1, L0772: 1, L0773: 1, L0768: 1, L0649: 1, L0775: 1, L0653: 1, L0776: 1, L0657: 1, L0656: 1, L0659: 1, L0526: 1, L0384: 1, L0809: 1, T0068: 1, H0593: 1, H0689: 1, H0435: 1, H0660: 1, S0330: 1, H0539: 1, S0152: 1, L0743: 1, L0777: 1, H0595: 1, L0591: 1, L0601: 1, S0192: 1, S0242: 1, S0194: 1, S0196: 1 and H0352: 1.		
150	HE8PW83	927280	462	2 - 388	1060	Asn-59 to Glu-67.			AR089: 0, AR061: 0 L0748: 6, L0749: 6, L0803: 3, L0774: 3, L0775: 3, H0574: 1, H0632: 1, H0013: 1, L0789: 1, L0790: 1, H0144: 1 and L0581: 1.		
151	HWLEA48	927532	463	1 - 546	1061	Glu-69 to Gln-76.			AR089: 1, AR061: 0 S0354: 1 and L0596: 1.		
152	HNHNP81	927676	161	100 - 408	759	Pro-1 to Thr-8.			AR051: 23, AR054: 11, AR050: 9, AR061:		

153	HFIDL68	928378	464	143 - 514	1062	Ile-1 to Ser-16.	8, AR089: 5 S0216: 1		
		1123641	163	1161 - 535	761	Pro-18 to Pro-27, Glu-67 to Lys-73, Phe-147 to Tyr-165, Thr-203 to Ser-209.			
		928475	465	2 - 529	1063	Glu-40 to Lys-46, Phe-120 to Ser-132.			
154	HUJCT05	1165261	164	2 - 1618	762	Gly-1 to Glu-7, Lys-16 to Leu-21, Ser-26 to Val-31, Asp-64 to Thr-70, Asp-131 to Asn-136, Lys-191 to Asp-197, Ala-259 to Glu-264, Glu-273 to Gly-279, Gln-296 to Ala-305, Asn-317 to Ser-322, Asn-345 to Ser-352, Gln-384 to Asn-392, Asn-407 to Gly-412, Gly-434 to Pro-441, Lys-476 to Asp-481, Gln-497 to Asn-507, His-523 to Asn-528.	AR089: 8, AR061: 4 H0653: 2, H0650: 1, H0050: 1, L0370: 1, L0800: 1, L0662: 1, L0653: 1, H0436: 1 and L0749: 1.		
		929264	466	2 - 520	1064	Lys-10 to Leu-15, Ser-20 to Val-25, Asp-58 to Thr-64, Asp-125 to Asn-130.			

155	HTEGO05	932583	165	3 - 884	763	Pro-12 to Tyr-21.	AR089: 1, AR061: 0 H0038: 2, L0745: 2 and H0616: 1.		
156	HRDBH58	1226719	166	183 - 2591	764	Asp-35 to Leu-41, Val-45 to Ser-57, Glu-134 to Asp-139, Pro-253 to Leu-259, Ser-301 to Gly-306, Leu-324 to Arg-330, Val-374 to Tyr-381, Gly-422 to Gly-427, Gly-466 to Gly-481, Lys-500 to Asp-505, Pro-540 to Asn-554, Arg-610 to Ala-616, Pro-773 to Ala-780.	AR089: 1, AR061: 0 H0620: 3, L0794: 3, S0212: 2, H0254: 2, H0545: 2, H0266: 2, L0639: 2, L0759: 2, H0556: 1, H0657: 1, S0418: 1, H0580: 1, S0045: 1, H0619: 1, H0550: 1, H0600: 1, H0590: 1, H0253: 1, H0581: 1, H0052: 1, H0309: 1, H0085: 1, H0083: 1, H0628: 1, H0617: 1, H0124: 1, H0059: 1, H0494: 1, S0144: 1, S0142: 1, S0426: 1, H0529: 1, L0796: 1, L0659: 1, L0790: 1, H0519: 1, H0711: 1, S0328: 1, H0521: 1, H0522: 1, S3014: 1, L0758: 1, S0260: 1, H0343: 1, S0434: 1, L0601: 1, H0668: 1 and H0542: 1.		
157	HSDGW22	934467	167	124 - 324	765	Leu-49 to Tyr-54.	AR061: 0, AR089: 0		

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158	HNTMD79	1126594	168	1 - 663	766	Thr-1 to Gly-11, Thr-26 to Gly-34.	L0794: 4, L0438: 4, L0761: 3, L0766: 3, L0748: 3, L0439: 3, H0556: 2, L0602: 2, L0754: 2, L0779: 2, H0580: 1, H0208: 1, H0013: 1, T0082: 1, S0010: 1, H0428: 1, H0553: 1, H0038: 1, H0616: 1, H0494: 1, L0796: 1, L0800: 1, L0773: 1, L0533: 1, L0803: 1, L0776: 1, L0657: 1, L0791: 1, H0520: 1, H0519: 1, H0521: 1, H0187: 1, L0731: 1, S0031: 1 and L0366: 1.		
							AR089: 2, AR061: 2 H0519: 2, S0420: 1, T0114: 1, H0013: 1, S0346: 1, H0038: 1, S0142: 1, H0520: 1, H0521: 1 and H0136: 1.		
159	HCE5J51	1197900	169	182 - 586 2 - 703	1066 767	Arg-20 to Ala-25, Asp-56 to Val-62, Gln-88 to Ala-93, Thr-126 to Ala-132, Gln-142 to Asn-160.	AR061: 4, AR089: 2 H0052: 7, L0809: 4, H0663: 3, L0439: 3, L0752: 3, H0587: 2, L0565: 2, H0550: 1.		

						Ser-189 to Asn-196.	H0194: 1, H0562: 1, H0571: 1, L0435: 1, L0769: 1, L0787: 1 and L0755: 1.		
						Pro-15 to Cys-22.			
160	HHEFQ42	934524 1151482	469 170	227 - 781 3 - 947	1067 768	Val-57 to Tyr-65, Asp-73 to Lys-81, Arg-118 to Arg-123, Asp-140 to Leu-147, Pro-151 to Thr-156, Ala-163 to Glu-168, Pro-177 to Thr-187, Asp-220 to Thr-229, Thr-283 to Thr-289.	AR089: 8, AR061: 3 L0803: 6, L0759: 6, L0740: 4, S0410: 3, L0764: 3, L0766: 3, L0804: 3, H0144: 3, S0406: 3, L0731: 3, L0362: 3, S0358: 2, S0444: 2, H0596: 2, H0644: 2, H0124: 2, L0770: 2, L0663: 2, H0539: 2, L0747: 2, L0750: 2, L0779: 2, L0757: 2, L0758: 2, H0624: 1, H0171: 1, H0639: 1, L0717: 1, H0411: 1, S0222: 1, H0441: 1, H0431: 1, H0574: 1, H0013: 1, H0156: 1, H0085: 1, L0471: 1, T0023: 1, H0163: 1, H0130: 1, L0762: 1, L0763: 1, L0662: 1, L0794: 1, L0775: 1, L0375: 1, L0805: 1, L0659: 1,		

161	HLQDC55	934527 1082368	470 171	29 - 1072 2 - 499	1068 769	Gly-19 to Ile-27, Thr-31 to Asp-41, Asp-58 to Phe-67, Ser-79 to Lys-85, Leu-119 to Glu-127.  Gly-19 to Ile-27, Thr-31 to Asp-41, Asp-58 to Phe-67, Ser-79 to Lys-85, Leu-119 to Glu-127.	AR061: 9, AR089: 3 H0574: 1 and S0344: 1.	L0783: 1, L0666: 1, S0374: 1, H0520: 1, H0658: 1, H0672: 1, S0330: 1, L0743: 1, L0751: 1, L0777: 1 and H0542: 1.		
162	HFPHI62	1195825	172	1 - 1119	770	Ala-5 to Gly-13, Pro-31 to Gln-37, Ala-46 to Ala-69, Tyr-81 to Ser-87, Ser-120 to Ile-137, Thr-148 to Thr-156, Lys-181 to Phe-191, Pro-275 to Asn-297, Asp-322 to Gly-331, Lys-352 to Glu-359, Gln-365 to Ser-372.	AR061: 226, AR089: 79 L0439: 8, H0052: 7, L0741: 7, L0756: 4, S0010: 3, H0261: 2, H0156: 2, S0049: 2, L0770: 2, L0776: 2, L0742: 2, L0745: 2, L0366: 2, S0222: 1, H0438: 1, H0390: 1, S0346: 1, H0009: 1, L0455: 1, S0038: 1, L0789: 1 and L0758: 1.			

163	HE8QH09	934529	472	3 - 410	1070	Met-1 to Gln-6, Pro-38 to Asn-60.	AR089: 3, AR061: 3 H0261: 1, H0013: 1, H0052: 1, H0009: 1, H0144: 1 and L0438: 1.			
		1152238	173	1 - 597	771	Ala-46 to Ser-53, Pro-63 to Leu-78, Asp-106 to Asp-114, Glu-129 to Leu-136, Gly-144 to Asp-149.				
164	HFAAX29	934532	473	2 - 625	1071	Gly-4 to Thr-9.				
		1128791	174	1 - 585	772	Ala-108 to His-113, Asp-149 to Asn-154, Cys-179 to Val-186.	AR089: 12, AR061: 4 H0242: 2, S0040: 1, S6024: 1, S6014: 1, H0586: 1, H0013: 1, H0124: 1, L0756: 1, L0592: 1, L0366: 1 and H0542: 1.			
165	HHFOC79	934540	474	2 - 565	1072					
		1182276	175	157 - 681	773	Ala-1 to Trp-9, Pro-12 to Gln-17, Arg-37 to Pro-42, Thr-44 to Lys-51, Pro-66 to Pro-80, Thr-97 to Ala-106, Pro-120 to Trp-128, Leu-131 to Gly-137.	AR051: 14, AR089: 6, AR061: 4, AR050: 2, AR054: 2 L0744: 9, L0747: 8, S3014: 7, L0740: 7, S0192: 6, S0027: 5, S0212: 4, H0124: 4, L0731: 4, L0662: 3, L0743: 3, L0752: 3, L0759: 3, H0662: 2, S0418: 2, S0046: 2, H0575: 2, H0545: 2, H0041: 2, H0413: 2, L0775: 2, H0696: 2,			





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# TABLE "SETHS260"

									H0519: 1, H0435: 1, H0672: 1, H0436: 1, S3014: 1, S0028: 1, L0750: 1, L0777: 1, L0366: 1, H0667: 1 and H0423: 1.		
		940369	477	63 - 977	1075	His-12 to Arg-20, Pro-26 to Asp-43, Ala-62 to Glu-70, Arg-78 to Arg-83, Phe-100 to Gln-105, Gly-129 to Glu-136.					
169	HE9FI33	1156432	179	2 - 286	777	Glu-65 to Pro-70.			AR061: 6, AR089: 2 L0749: 2, H0144: 1 and L0748: 1.		
		941348	478	3 - 434	1076						
170	HNHCP79	565781	180	23 - 301	778	Gly-16 to Asn-21.			AR051: 9, AR054: 9, AR050: 7, AR061: 3, AR089: 2 H0271: 26, H0521: 26, H0046: 20, L0747: 20, S0278: 14, S0052: 14, L0754: 12, L0599: 12, S0142: 11, S0428: 11, H0179: 10, S0344: 10, L0776: 9, H0638: 8, L0771: 8, L0666: 8, S0360: 7, S0144: 7, L0775: 7, L0659: 7, H0422: 7, S0354: 6,		

Figure 1 consists of 12 subplots arranged in a 6x2 grid, labeled (a) through (l). Each subplot shows the probability of a successful attack ( $P_s$ ) on the y-axis (ranging from 0.0 to 1.0) against a parameter on the x-axis. The left column (a-f) shows the effect of increasing the number of nodes ( $N$ ) from 10 to 100. The right column (g-l) shows the effect of increasing the number of edges ( $E$ ) from 10 to 100. The top row (a, g) shows the effect of increasing  $N$  from 10 to 100. The bottom row (f, l) shows the effect of increasing  $E$  from 10 to 100. The plots show that  $P_s$  generally increases with  $N$  and  $E$ , and that the effect of  $E$  is more pronounced than that of  $N$ .

H0580: 6, H0622: 6,  
 H0641: 6, H0522: 6,  
 L0740: 6, L0595: 6,  
 H0581: 5, H0416: 5,  
 H0673: 5, L0598: 5,  
 L0774: 5, S3014: 5,  
 L0777: 5, L0759: 5,  
 L0362: 5, H0423: 5,  
 H0069: 4, H0674: 4,  
 L0770: 4, L0769: 4,  
 L0750: 4, L0752: 4,  
 L0731: 4, L0757: 4,  
 L0603: 4, S0114: 3,  
 S0134: 3, S0116: 3,  
 H0341: 3, S0418: 3,  
 S0358: 3, H0545: 3,  
 H0050: 3, H0646: 3,  
 L0768: 3, L0664: 3,  
 S0053: 3, S0216: 3,  
 S0374: 3, S0404: 3,  
 S0206: 3, L0745: 3,  
 L0756: 3, L0581: 3,  
 H0170: 2, H0222: 2,  
 L0785: 2, H0663: 2,  
 S0376: 2, S0132: 2,  
 S0222: 2, H0370: 2,  
 H0486: 2, H0013: 2,  
 H0635: 2, S0280: 2,  
 H0575: 2, H0036: 2,  
 H0618: 2, H0597: 2,  
 H0014: 2, H0039: 2,

L0142: 2, H0551: 2,  
H0056: 2, H0561: 2,  
S0426: 2, L0763: 2,  
L0761: 2, L0648: 2,  
L0662: 2, L0767: 2,  
L0655: 2, L0519: 2,  
L0665: 2, H0519: 2,  
H0435: 2, H0696: 2,  
S0027: 2, L0743: 2,  
L0751: 2, S0031: 2,  
S0260: 2, H0445: 2,  
S0434: 2, L0590: 2,  
S0276: 2, H0395: 1,  
H0556: 1, T0002: 1,  
H0685: 1, S0040: 1,  
H0294: 1, S0218: 1,  
S0001: 1, H0484: 1,  
H0483: 1, H0662: 1,  
H0176: 1, H0589: 1,  
H0459: 1, S0356: 1,  
S0408: 1, S0410: 1,  
L0717: 1, H0411: 1,  
H0549: 1, H0550: 1,  
H0431: 1, H0608: 1,  
H0409: 1, H0404: 1,  
H0587: 1, H0485: 1,  
H0250: 1, L0021: 1,  
H0590: 1, H0318: 1,  
T0071: 1, H0421: 1,  
H0263: 1, H0596: 1,  
H0150: 1, H0009: 1,

L0471: 1, H0011: 1, S0051: 1, H0083: 1, H0510: 1, H0594: 1, S0318: 1, H0687: 1, H0286: 1, S0250: 1, H0328: 1, H0553: 1, L0055: 1, H0032: 1, H0169: 1, H0316: 1, H0135: 1, H0090: 1, H0591: 1, H0634: 1, H0413: 1, H0623: 1, H0059: 1, T0069: 1, S0038: 1, H0100: 1, T0041: 1, H0509: 1, S0150: 1, H0633: 1, S0002: 1, H0529: 1, L0762: 1, L0667: 1, L0772: 1, L0646: 1, L0643: 1, L0521: 1, L0766: 1, L0389: 1, L0653: 1, L0629: 1, L0527: 1, L0657: 1, L0517: 1, L0384: 1, L0809: 1, L0663: 1, H0144: 1, H0697: 1, S0126: 1, H0690: 1, H0670: 1, H0648: 1, S0378: 1, S0380: 1, H0518: 1, S0152: 1, S0013: 1, S0044: 1, H0214: 1, H0555: 1,	
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									H0586: 1, H0156: 1, S0010: 1, H0596: 1, S0051: 1, T0010: 1, H0271: 1, L0143: 1, H0617: 1, H0652: 1, L0764: 1, L0794: 1, L0806: 1, L0809: 1, H0518: 1, H0478: 1, L0751: 1, L0747: 1, L0750: 1, L0780: 1, L0731: 1 and L0366: 1.		
173	HFKKN77	943757	183	145 - 684	781	Thr-9 to Val-16.			AR061: 6, AR089: 2 H0620: 2, H0024: 2, H0208: 1, S0222: 1, H0194: 1, H0123: 1, H0051: 1 and S0052: 1.		
174	HTEMU66	1205381	184	462 - 962	782	His-3 to Ser-14, Thr-20 to Ser-27, Pro-41 to Asn-50, Glu-101 to Asp-109, Leu-149 to Ser-154.			AR061: 7, AR089: 5 H0616: 1		
		944419	482	454 - 963	1080	Ala-1 to Gln-7, Lys-24 to Ser-30, Pro-44 to Asn-53, Glu-104 to Asp-112, Leu-152 to Ser-157.					
175	HWAGU62	1206797	185	210 - 1511	783	Thr-1 to Leu-9, Pro-34 to Lys-40, Glu-82 to Gln-87, Ala-216 to His-233,			AR061: 5, AR089: 5 S0356: 9, L0803: 3, L0766: 2, L0743: 2, L0731: 2, L0785: 1,		



						Met-235 to His-243, Pro-322 to Lys-327, Arg-346 to Trp-351.	S0116: 1, S0354: 1, S0358: 1, S0278: 1, H0642: 1, H0486: 1, H0581: 1, H0596: 1, H0355: 1, S0003: 1, L0455: 1, H0090: 1, H0591: 1, S0142: 1, S0344: 1, S0422: 1, S0426: 1, L0598: 1, L0794: 1, L0804: 1, L0659: 1, L0789: 1, L0664: 1, H0547: 1, H0660: 1, S0330: 1, L0754: 1, L0779: 1, L0758: 1, L0608: 1, S0026: 1 and H0543: 1.		
						Pro-100 to Lys-106, Glu-148 to Gln-153.			
176	HFPFB39	945368	483	1 - 1500	1081	Glu-62 to Tyr-67, Pro-169 to Lys-179, Pro-189 to Ala-201, Ala-218 to Arg-223, Tyr-324 to Asn-331, Gly-352 to Val-357, Leu-365 to Lys-371, His-393 to Ala-399, Asp-420 to Asn-425, Thr-460 to Lys-473, Ser-488 to Gly-502.	AR061: 6, AR089: 3 S0010: 4, S0222: 3, H0455: 2, L0803: 2, L0439: 2, L0745: 2, S0282: 1, S0400: 1, H0456: 1, H0441: 1, S0346: 1, H0509: 1, L0769: 1, L0438: 1, L0756: 1 and S0106: 1.		
		946170	484	1613 - 462	1082	Pro-36 to Lys-46,			

177	HPMFI38	1165993	187	3 - 410	785	Pro-56 to Ala-68, Ala-85 to Arg-90, Tyr-191 to Asn-198, Gly-219 to Val-224, Leu-232 to Lys-238, His-260 to Ala-266.	AR061: 3, AR089: 2 L0754: 3, H0644: 2, L0803: 2, L0748: 2, H0620: 1, H0031: 1, L0774: 1 and L0789: 1.		
		946252	485	992 - 495	1083	Leu-143 to Thr-149, Gln-152 to Glu-157.			
178	HBXDJ07	946830	188	125 - 652	786	Glu-62 to Lys-68, Asn-105 to Gly-113.	AR061: 2, AR089: 2 L0439: 11, L0794: 5, L0666: 5, S0222: 4, H0052: 3, L0756: 3, H0624: 2, S0228: 2, S0038: 2, L0638: 2, L0805: 2, L0664: 2, L0438: 2, L0740: 2, H0171: 1, S6024: 1, H0013: 1, H0374: 1, H0050: 1, S0050: 1, H0051: 1, S0386: 1, L0769: 1, L0768: 1, L0776: 1, L0659: 1, L0789: 1, H0144: 1, L0745: 1 and L0746: 1.		
179	HOFMS43	1152417	189	1 - 1029	787	Pro-1 to Asp-16,	AR051: 15, AR050: 9,		

						Pro-60 to Asn-65, Tyr-83 to Tyr-89, Ser-102 to Pro-115, Pro-130 to Glu-141, Ser-151 to Glu-160, Trp-177 to Glu-183, Phe-191 to Arg-198, Phe-203 to Tyr-209, Asn-234 to Ala-240, Pro-266 to Pro-271, Ser-276 to Thr-311, Arg-338 to Gly-343.	AR089: 7, AR061: 5, AR054: 1 H0415: 1		
						Asp-1 to Asp-17, Pro-61 to Asn-66, Tyr-84 to Tyr-90, Ser-103 to Trp-110.			
180	HOVCO14	1091087	190	3 - 563	788	Arg-78 to His-85, Leu-99 to Lys-104, Lys-123 to His-132, Thr-164 to Pro-171.	AR089: 3, AR061: 2 S6016: 1 and H0428: 1.		
						Arg-78 to His-85, Leu-99 to Lys-104, Lys-123 to His-132, Ser-157 to Pro-174.			
181	HTEPE35	1105272	191	1 - 762	789	Tyr-1 to Lys-8, Phe-19 to Ser-24, Thr-28 to Ser-34, Pro-54 to Trp-70, Leu-110 to Asn-118, Ser-145 to Asp-151,	AR061: 4, AR089: 1 L0758: 7, L0768: 2, H0616: 1 and L0151: 1.		

182	HE8UA52	948475	488	839 - 78	1086	Pro-162 to Val-172, Pro-180 to Thr-185. Tyr-1 to Lys-8, Phe-19 to Ser-24, Thr-28 to Ser-34, Pro-54 to Trp-70.	AR061: 6, AR089: 1 L0752: 5, H0013: 2, L0780: 2, H0624: 1, H0170: 1, H0645: 1, H0318: 1, L0750: 1, L0779: 1 and L0777: 1.		
		1229490	192	1 - 1728	790	Pro-22 to Gly-32, Arg-52 to Gly-60, Ser-78 to Met-89, Ile-100 to Ser-106, Asp-130 to Leu-137, Tyr-146 to Ala-151.			
		948509	489	1 - 615	1087	Pro-22 to Gly-32, Arg-52 to Gly-60, Ser-78 to Met-89, Ile-100 to Ser-106, Asp-130 to Leu-137, Tyr-146 to Ser-152.			
183	HOUBE50	1090776	193	1 - 1188	791	Ser-50 to Glu-62.	AR061: 1, AR089: 0 S0040: 1, S0222: 1, L0471: 1 and L0517: 1.		
		948519	490	1 - 243	1088	Ser-50 to Ser-66.			
184	HAJAV28	1165229	194	3 - 1073	792	Pro-1 to Ala-12, Ile-264 to Val-277, Gln-304 to Gln-309, Ile-324 to Leu-330.	AR089: 3, AR061: 1 L0747: 12, L0755: 12, L0766: 9, L0438: 9, L0754: 7, H0046: 6, L0751: 6, L0752: 6, H0068: 5, L0775: 5, L0439: 5, S0010: 4, H0547: 4, S0152: 4,		

					L0740: 4, L0779: 4, L0759: 4, H0591: 3, L0771: 3, L0662: 3, L0774: 3, L0666: 3, S0028: 3, L0748: 3, L0756: 3, L0731: 3, L0757: 3, H0624: 2, S0045: 2, H0619: 2, S0222: 2, S0049: 2, H0052: 2, H0615: 2, S0036: 2, T0041: 2, H0509: 2, S0002: 2, S0426: 2, L0769: 2, L0776: 2, L0659: 2, H0521: 2, H0707: 2, L0594: 2, L0362: 2, S0011: 2, H0170: 1, H0171: 1, H0685: 1, S0040: 1, T0049: 1, H0657: 1, S0001: 1, H0638: 1, S0358: 1, S0360: 1, S0408: 1, H0637: 1, S0007: 1, S0132: 1, S6022: 1, H0550: 1, H0431: 1, H0455: 1, H0574: 1, H0486: 1, T0114: 1, H0250: 1, H0069: 1, H0156: 1, L0105: 1, H0597: 1, H0546: 1, H0545: 1, H0050: 1,	
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Figure 1 consists of 12 sub-graphs labeled (a) through (l), each showing the growth of *E. coli* O157:H7 in ground beef under different treatment conditions. The y-axis for all graphs is  $\log_{10}$  CFU/g, ranging from 0 to 10. The x-axis is time in hours, ranging from 0 to 24. The graphs show various growth curves, with some treatments showing significant inhibition of growth compared to the control.

- (a) Control: Shows a steady increase in bacterial count from approximately  $10^1$  to  $10^9$  CFU/g over 24 hours.
- (b) Penicillin G: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (c) Penicillin V: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (d) Penicillin G + Penicillin V: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (e) Penicillin G + Penicillin V + Penicillin K: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (f) Penicillin G + Penicillin V + Penicillin K + Penicillin L: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (g) Penicillin G + Penicillin V + Penicillin K + Penicillin L + Penicillin M: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (h) Penicillin G + Penicillin V + Penicillin K + Penicillin L + Penicillin M + Penicillin N: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (i) Penicillin G + Penicillin V + Penicillin K + Penicillin L + Penicillin M + Penicillin N + Penicillin O: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (j) Penicillin G + Penicillin V + Penicillin K + Penicillin L + Penicillin M + Penicillin N + Penicillin O + Penicillin P: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (k) Penicillin G + Penicillin V + Penicillin K + Penicillin L + Penicillin M + Penicillin N + Penicillin O + Penicillin P + Penicillin Q: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.
- (l) Penicillin G + Penicillin V + Penicillin K + Penicillin L + Penicillin M + Penicillin N + Penicillin O + Penicillin P + Penicillin Q + Penicillin R: Shows a slight decrease in bacterial count, reaching approximately  $10^8$  CFU/g at 24 hours.

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						Ala-77 to Arg-82, Glu-207 to His-212, Glu-252 to Glu-261, Asp-279 to Asn-284.	L0659: 4, L0758: 4, L0777: 3, S0360: 2, L0775: 2, L0750: 2, L0731: 2, H0295: 1, S0218: 1, H0255: 1, H0402: 1, L0717: 1, H0411: 1, H0015: 1, H0030: 1, H0644: 1, H0673: 1, H0087: 1, L0770: 1, L0769: 1, L0637: 1, L0761: 1, L0646: 1, L0387: 1, L0766: 1, L0776: 1, L0655: 1, L0789: 1, H0683: 1, S0027: 1, L0748: 1, L0779: 1 and L0757: 1.		
186	HELHF07	949061	492	2 - 325	1090	Ala-20 to Arg-25.	AR061: 5, AR089: 4 S0045: 2		
187	HE9QQ22	949067	196	65 - 340	794	Thr-16 to Pro-21.	AR061: 11, AR089: 3 L0748: 3, H0144: 2, H0632: 1 and L0581: 1.		
188	HSDSB06	1127726	197	41 - 436	795				
		949080	493	3 - 563	1091				
		1128280	198	3 - 863	796	Ile-25 to Asn-36, Glu-54 to Val-63, Gly-81 to Glu-86, Gly-108 to Thr-114, Val-125 to Ser-131.	AR061: 4, AR089: 3 H0590: 7, L0754: 5, H0156: 3, L0731: 3, L0600: 3, S0360: 2, H0339: 2, S0472: 2, L0803: 2, L0751: 2,		

949151	494	3 - 863	1092	Ile-25 to Asn-36, Glu-54 to Val-63,
L0779: 2, L0759: 2, S0031: 2, L0596: 2, S0212: 1, H0411: 1, S0222: 1, H0409: 1, H0601: 1, H0333: 1, H0632: 1, H0427: 1, L0021: 1, H0037: 1, H0596: 1, H0024: 1, H0239: 1, S6028: 1, H0266: 1, H0687: 1, H0328: 1, H0644: 1, H0674: 1, H0598: 1, T0067: 1, H0509: 1, L0763: 1, L0772: 1, L0764: 1, L0771: 1, L0773: 1, L0650: 1, L0806: 1, L0659: 1, L0547: 1, L0809: 1, L0666: 1, L0663: 1, L0665: 1, S0328: 1, S0380: 1, S0390: 1, S0032: 1, L0744: 1, L0745: 1, L0746: 1, L0747: 1, L0756: 1, L0777: 1, L0758: 1, L0588: 1, S0276: 1, S0196: 1, S0412: 1 and H0506: 1.				



189	HACAD35	949199	199	1473 - 916	797	Gly-81 to Glu-86, Gly-108 to Thr-114, Val-125 to Ser-131.	AR061: 2, AR089: 1 L0637: 2, L0783: 2, L0777: 2, S6022: 1, H0392: 1, H0586: 1, H0050: 1, L0809: 1, L0759: 1 and S0192: 1.			
190	HEQAPI7	949358	200	819 - 295	798		AR051: 744, AR054: 681, AR050: 564, AR061: 2, AR089: 1 S0192: 3, H0544: 1, L0766: 1, L0804: 1, H0521: 1 and L0747: 1.			
191	HMTBB17	1128589	201	1 - 366	799	Arg-18 to Pro-23, Pro-25 to Gly-37, Ile-48 to Ile-61, Asp-69 to Gly-74, Ser-105 to Asn-112.	AR089: 3, AR061: 3 L0438: 3, L0439: 3, L0749: 3, L0758: 3, L0766: 2, L0375: 2, L0731: 2, L0759: 2, L0803: 1, L0655: 1, L0517: 1, L0666: 1, L0664: 1, H0518: 1, L0748: 1, L0779: 1, L0599: 1 and H0008: 1.			
		950884	495	513 - 100	1093	Arg-34 to Pro-39, Pro-41 to Gly-53, Ile-64 to Ile-77, Asp-85 to Gly-90, Ser-121 to Asn-128.				

192	HKGDE58	1129137	202	2 - 541	800	Asp-1 to Cys-10, Glu-31 to Pro-38, Met-43 to Val-48, Asp-97 to Phe-110, Asp-119 to Gly-137.	AR089: 2, AR061: 2 H0538: 1, L0803: 1 and L0731: 1.		
		945039	496	11 - 937	1094	Asp-17 to Cys-26, Glu-47 to Pro-54, Met-59 to Val-64, Asp-113 to Phe-126, Asp-135 to Gly-153.			
		950885	497	469 - 119	1095	Ser-20 to Gly-32, Ile-43 to Ile-56, Asp-64 to Gly-69, Ser-100 to Asn-107.			
193	HCHMW40	1144323	203	539 - 3	801	Phe-1 to Trp-6, Ser-41 to Arg-56, Pro-162 to Leu-174.	AR089: 9, AR061: 4 H0586: 14, H0587: 8, L0763: 6, H0592: 4, H0484: 3, H0081: 3, H0063: 3, H0483: 2, H0664: 2, H0601: 1, H0600: 1, H0494: 1, L0648: 1, H0658: 1, S0328: 1 and L0747: 1.		
		951518	498	84 - 572	1096	Ser-7 to Gly-14, Leu-22 to Ala-28, Thr-57 to Ser-62.			
194	HE8QZ34	1143411	204	2 - 1306	802	Ser-85 to Arg-90, His-99 to Met-105, Met-119 to Val-125, Lys-127 to Ile-133,	AR089: 4, AR061: 1 H0046: 4, H0591: 2, T0067: 2, L0766: 2, H0144: 2, H0521: 2,		

						Lys-215 to Tyr-221, Phe-239 to Lys-247, Asn-293 to Asp-298, Gln-404 to Tyr-411.			L0744: 2, L0439: 2, H0170: 1, H0013: 1, H0599: 1, S0182: 1, H0051: 1, H0510: 1, S6028: 1, L0455: 1, H0616: 1, S0422: 1, S0374: 1, L0438: 1, S0390: 1, L0748: 1 and L0604: 1.		
	952283	499	3 - 1025	1097	Ser-85 to Arg-90, His-99 to Met-105, Met-119 to Val-125, Lys-127 to Ile-133, Lys-215 to Tyr-221, Phe-239 to Lys-247, Asn-293 to Gly-298.						
195	HWAFG04	1227627	205	2 - 850	803	Gln-103 to Asp-113, Ser-182 to Phe-200, Cys-211 to Ser-221, Gln-233 to Ala-238, Glu-256 to Ser-264.			AR089: 17, AR061: 8 L0789: 4, L0758: 4, H0657: 3, H0052: 3, L0438: 3, L0744: 3, L0779: 3, L0005: 2, H0581: 2, H0194: 2, H0046: 2, H0038: 2, L0800: 2, L0659: 2, H0521: 2, L0743: 2, L0439: 2, H0556: 1, S0282: 1, S0358: 1, H0619: 1, H0586: 1, H0618: 1, H0231: 1, S0362: 1, H0622: 1,		

196	HTEKT33	952878	500	1658 - 789	1098	Gln-110 to Asp-120, Ser-189 to Phe-207, Cys-218 to Ser-228, Gln-240 to Ala-245, Glu-263 to Ser-271.	T0006: 1, H0616: 1, H0413: 1, H0623: 1, L0351: 1, S0150: 1, L0769: 1, L0372: 1, L0662: 1, L0794: 1, L0775: 1, L0651: 1, L0527: 1, L0657: 1, L0666: 1, H0547: 1, H0690: 1, H0658: 1, H0672: 1, H0539: 1, S0378: 1, H0555: 1, L0754: 1, L0747: 1, L0780: 1, L0596: 1, S0192: 1, H0542: 1 and H0423: 1.		
		1075836	206	189 - 1268	804	Pro-19 to Gly-24, Val-41 to Phe-47, Lys-75 to Asp-83, Ser-138 to Gln-154, Asp-230 to Ser-235, Asp-278 to Thr-283, Pro-315 to Ser-324, Trp-338 to Thr-344.	AR089: 15, AR061: 9 L0766: 4, L0745: 3, L0752: 3, S0360: 2, L0748: 2, L0746: 2, L0755: 2, H0624: 1, S0114: 1, H0098: 1, L0471: 1, H0083: 1, H0428: 1, L0483: 1, H0090: 1, H0616: 1, H0494: 1, H0560: 1,		

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						H0509: 1, L0761: 1, L0772: 1, L0803: 1, L0776: 1, L0655: 1, L0792: 1, L0664: 1, S0374: 1, L0438: 1, H0520: 1, H0519: 1, H0435: 1, H0648: 1, S0152: 1, H0521: 1, H0478: 1, L0747: 1, L0756: 1, L0779: 1, L0758: 1, L0759: 1, H0667: 1, H0543: 1 and L0465: 1.			
197	HBXDM07	953308	501	200 - 1426	1099		Leu-89 to Tyr-96, Leu-195 to Glu-209, Val-253 to Ser-259, Ile-274 to Phe-279, Lys-317 to His-323, Lys-338 to Phe-345, Ile-361 to Ser-366, Glu-370 to Gln-375, Lys-398 to Lys-404, Val-482 to Arg-492, Met-539 to Glu-548, Gly-573 to Tyr-578.	AR089: 9, AR061: 1 L0777: 7, L0747: 5, H0556: 4, L0794: 4, L0592: 4, H0497: 3, H0052: 3, L0803: 3, H0087: 2, L0439: 2, L0749: 2, L0593: 2, H0459: 1, S0046: 1, L0717: 1, H0575: 1, S0010: 1, H0390: 1, H0194: 1, H0050: 1, H0375: 1, L0055: 1, S0036: 1, H0059: 1, S0038: 1, H0494: 1, S0002: 1, L0809: 1, L0789: 1, L0663: 1,	

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									L0665: 1, S0330: 1, H0521: 1, H0522: 1, H0696: 1, H0555: 1, S0028: 1, L0731: 1, L0759: 1, L0581: 1, H0542: 1 and H0422: 1.		
198	HFPFA83	953622 955614	502 208	81 - 716 187 - 735	1100 806	Thr-9 to Val-16.	AR054: 375, AR051: 284, AR050: 235, AR061: 96, AR089: 33 H0620: 2, H0024: 2, H0208: 1, S0222: 1, H0194: 1, H0123: 1, H0051: 1 and S0052: 1.				
199	HKADO36	1189002	209	3 - 815	807	Ala-6 to Pro-12, Glu-22 to Ala-41, Ser-230 to Ala-238, Asp-257 to Ser-268.	AR089: 2, AR061: 1 H0069: 2, H0497: 1, H0494: 1, L0769: 1, S0028: 1 and H0542: 1.				
200	HFXKG51	956115 956596	503 210	2 - 280 578 - 3	1101 808	His-13 to Asn-24, Pro-147 to Asn-157, Gln-164 to Glu-169.	AR089: 2, AR061: 1 S0028: 2, S0282: 1 and S0051: 1.				
201	HFPHR82	1187749	211	3 - 1328	809	Ile-258 to Val-271, Gln-298 to Gln-303, Ile-318 to Leu-324, Glu-353 to Leu-361, Ser-397 to Arg-408, Gly-427 to Leu-433.	AR089: 3, AR061: 1 L0747: 12, L0755: 12, L0766: 9, L0438: 9, L0754: 7, H0046: 6, L0751: 6, L0752: 6, H0068: 5, L0775: 5, L0439: 5, S0010: 4, H0547: 4, S0152: 4,				


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						L0163: 1, H0594: 1, H0266: 1, H0290: 1, S0214: 1, H0328: 1, H0688: 1, H0622: 1, H0032: 1, H0673: 1, H0674: 1, S0364: 1, H0090: 1, H0040: 1, H0551: 1, T0067: 1, H0268: 1, H0100: 1, H0494: 1, H0560: 1, H0561: 1, H0633: 1, L0762: 1, L0763: 1, L0638: 1, L0772: 1, L0773: 1, L0521: 1, L0768: 1, L0794: 1, L0803: 1, L0809: 1, L0545: 1, L0664: 1, L0665: 1, H0144: 1, S0126: 1, H0660: 1, H0672: 1, S0378: 1, S0380: 1, S0350: 1, H0555: 1, H0436: 1, H0540: 1, S0390: 1, S0206: 1, S0032: 1, L0741: 1, L0749: 1, L0786: 1, L0777: 1, L0758: 1, S0026: 1 and H0506: 1.	
957528	504	1592 - 273	1102	Ile-256 to Val-269, Gln-296 to Gln-301,			



202	HISAF59	959140	212	130 - 843	810	Ile-316 to Leu-322, Glu-351 to Leu-359, Ser-395 to Arg-406, Gly-425 to Leu-431. Gly-33 to Ser-48.	AR089: 2, AR061: 2 L0789: 4, L0758: 4, H0657: 3, H0052: 3, H0046: 3, L0438: 3, L0744: 3, L0779: 3, L0005: 2, H0586: 2, H0581: 2, H0194: 2, H0038: 2, L0800: 2, L0659: 2, H0521: 2, L0743: 2, L0439: 2, H0556: 1, S0282: 1, S0358: 1, H0619: 1, H0618: 1, H0231: 1, H0569: 1, S0362: 1, H0622: 1, T0006: 1, H0135: 1, H0616: 1, H0413: 1, H0623: 1, L0351: 1, S0150: 1, L0769: 1, L0372: 1, L0662: 1, L0794: 1, L0775: 1, L0651: 1, L0527: 1, L0657: 1, L0666: 1, H0144: 1, H0547: 1, H0690: 1, H0658: 1, H0672: 1, H0539: 1, S0378: 1,		
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# TABLE "SETH9.60"

203	HCEHD66	1136122	213	2 - 562	811	Ala-1 to Lys-6, Leu-13 to Gln-25, Asp-70 to Gly-75, Gly-92 to Lys-97, Asp-106 to Tyr-112, Leu-135 to Val-146, Glu-165 to Asp-173.	H0555: 1, L0754: 1, L0747: 1, L0780: 1, L0596: 1, S0192: 1, H0542: 1 and H0423: 1. AR061: 7, AR089: 3 L0769: 9, S0051: 4, H0441: 3, S0036: 3, L0809: 3, L0789: 3, L0438: 3, L0439: 3, L0731: 3, H0052: 2, H0687: 2, H0181: 2, L0800: 2, L0794: 2, L0665: 2, L0741: 2, L0742: 2, L0756: 2, S0031: 2, H0171: 1, H0556: 1, S6024: 1, S0029: 1, H0411: 1, S0278: 1, H0455: 1, H0486: 1, L0109: 1, H0251: 1, L0163: 1, H0617: 1, H0413: 1, L0762: 1, L0638: 1, L0639: 1, L0761: 1, L0764: 1, L0662: 1, L0774: 1, L0807: 1, L0657: 1, S0053: 1, S0126: 1, H0626: 1, L0747: 1, L0757: 1, L0759: 1, L0597: 1 and L0608: 1.		
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959160	505	2 - 583	1103	Arg-1 to Lys-13, Leu-20 to Gln-32, Asp-77 to Gly-82, Gly-99 to Lys-104, Asp-113 to Tyr-119, Leu-142 to Val-153, Glu-172 to Asp-180.			
204	HE8UY74	1163590	214	1 - 492	812	AR061: 2, AR089: 1 H0013: 1 and S0027: 1.	
		960914	506	111 - 455	1104		
205	HAHY08	962113	215	3 - 278	813	AR061: 10, AR089: 6	
206	H2CBH45	1128919	216	2 - 841	814	AR061: 3, AR089: 3 H0437: 1, S0280: 1, T0110: 1, H0622: 1, L0745: 1, L0746: 1, L0731: 1 and L0596: 1.	
		963811	507	2 - 421	1105		
207	HMVAM09	1194828	217	3 - 659	815	AR089: 4, AR061: 1 L0731: 7, L0517: 5, S0212: 3, L0775: 3, L0740: 3, H0266: 2, L0809: 2, H0696: 2, L0748: 2, S0132: 1,	

							H0574: 1, H0013: 1, H0544: 1, H0023: 1, H0071: 1, H0286: 1, H0100: 1, H0494: 1, S0370: 1, L0770: 1, L0646: 1, L0764: 1, L0771: 1, L0363: 1, L0774: 1, L0659: 1, L0789: 1, L0666: 1, S0126: 1, H0522: 1, L0754: 1, L0747: 1 and L0755: 1.		
208	HFPEN04	963814 1199663	508 218	2 - 802 96 - 1646	1106 816	Glu-62 to Tyr-67, Pro-169 to Lys-179, Pro-189 to Ala-201, Ala-218 to Arg-223, Tyr-324 to Asn-331, Gly-352 to Val-357, Leu-365 to Lys-371, His-393 to Ala-399, Asp-420 to Asn-425, Thr-460 to Lys-473, Ser-488 to Gly-502.  Glu-62 to Tyr-67, Ser-129 to Asp-135.	AR061: 5, AR089: 2 S0010: 4, S0222: 3, H0455: 2, L0803: 2, L0439: 2, L0745: 2, S0282: 1, S0400: 1, H0456: 1, H0441: 1, S0346: 1, H0509: 1, L0769: 1, L0438: 1, L0756: 1 and S0106: 1.		
209	HSLJD02	964824 1104452	509 219	88 - 540 67 - 927	1107 817	Leu-53 to Gln-58, Phe-162 to Gly-167, Gln-282 to Ala-287.	AR054: 7, AR051: 1, AR089: 1, AR061: 1, AR050: 0 S0390: 1		

# TABLE "SEB9450"

210	HDPFZ30	965826	510	47 - 907	1108	Leu-53 to Gln-58, Phe-162 to Gly-167, Gln-282 to Ala-287.	AR089: 6, AR061: 2 H0250: 5, L0770: 2, L0438: 2, L0439: 2, L0754: 2, S0114: 1, H0459: 1, H0489: 1, S0278: 1, H0069: 1, H0575: 1, H0318: 1, H0123: 1, L0471: 1, H0071: 1, H0328: 1, H0634: 1, T0067: 1, L0351: 1, H0560: 1, S0142: 1, S0344: 1, S0426: 1, L0763: 1, L0769: 1, L0761: 1, L0662: 1, L0363: 1, L0364: 1, L0805: 1, L0666: 1, L0664: 1, S0126: 1, H0658: 1, H0670: 1, H0521: 1, H0522: 1, S0044: 1, H0555: 1, H0576: 1, L0748: 1 and L0755: 1.		
		1220164	220	1637 - 819	818	Leu-31 to Gly-41, Arg-137 to Ser-143, Glu-241 to Glu-260.			
		966752	511	1637 - 819	1109	Leu-31 to Gly-41, Arg-137 to Ser-143, Glu-241 to Glu-260.			
211	HPJCR33	1217931	221	140 - 1681	819	Ser-1 to Leu-13, Pro-17 to Gly-31,	AR089: 2, AR061: 1 L0754: 8, L0777: 8,		

## 09263876 013701

						Thr-44 to Leu-54, His-84 to Arg-95, Asn-105 to Gln-116, Pro-132 to Leu-138, Glu-148 to Gly-157, Arg-180 to Trp-185, Asn-340 to Glu-346, Asn-401 to Cys-412, Asp-430 to Ala-435, Thr-473 to Lys-478, Pro-490 to Tyr-498.				L0439: 5, H0266: 2, L0438: 2, H0672: 2, S0152: 2, L0745: 2, L0758: 2, H0650: 1, S0212: 1, S0045: 1, S0046: 1, H0486: 1, L0563: 1, H0051: 1, H0644: 1, H0673: 1, H0551: 1, H0269: 1, S0344: 1, L0794: 1, L0766: 1, L0803: 1, L0805: 1, L0659: 1, H0547: 1, H0519: 1, S0126: 1, H0711: 1, H0528: 1, S0028: 1, L0750: 1, L0780: 1, L0757: 1, L0588: 1, L0591: 1, S0192: 1, H0423: 1 and H0293: 1.		
212	HTOAK34	966758 1081321	512 222	1 - 375 784 - 599	1110 820	Ser-10 to His-15.	AR089: 1, AR061: 1 L0766: 2, H0264: 1 and H0521: 1.					
213	HE8NI24	966800 971296	513 223	918 - 1196 318 - 749	1111 821	Ser-67 to Trp-77.	AR050: 3, AR051: 1, AR089: 0, AR061: 0 H0013: 3, L0794: 2, L0439: 2, L0756: 2, L0779: 2, L0758: 2, S0001: 1, H0619: 1.					

214	HAMFM39	1055532	224	782 - 2344	822	<p>Gly-1 to Pro-7,  Gly-23 to Gly-50,  Ser-53 to Pro-84,  Ser-89 to Thr-129,  Gly-140 to Gly-145,  Pro-148 to Lys-158,  Thr-161 to Ser-167,  Leu-179 to Arg-189,  Pro-203 to Lys-211,  Glu-233 to Asp-240,  Lys-261 to Gly-288,  Arg-296 to Glu-305,  Ala-315 to Arg-353,  Glu-372 to Pro-382,  Gln-395 to Glu-408,  Asn-419 to Gly-427,  Ala-458 to Gly-463,  Pro-477 to Ala-483.</p>	<p>L0638: 1, L0641: 1,  L0776: 1 and H0435: 1.  AR050: 193, AR054:  122, AR051: 84,  AR089: 0, AR061: 0  H0255: 59, H0254: 10,  H0617: 9, L0747: 8,  S0358: 7, H0486: 6,  L0655: 6, H0208: 4,  H0545: 4, H0024: 4,  S0354: 3, H0250: 3,  H0123: 3, H0031: 3,  L0659: 3, S0328: 3,  L0731: 3, H0583: 2,  L0808: 2, L0785: 2,  H0662: 2, H0586: 2,  H0618: 2, H0253: 2,  H0424: 2, H0264: 2,  H0488: 2, H0100: 2,  L0771: 2, L0806: 2,  L0809: 2, H0144: 2,  H0689: 2, L0749: 2,  L0750: 2, L0779: 2,  L0777: 2, H0707: 2,  L0595: 2, H0624: 1,  H0341: 1, S0356: 1,  S0360: 1, H0619: 1,  H0411: 1, H0370: 1,  H0485: 1, H0635: 1,  H0025: 1, H0108: 1,</p>		
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215	HBGMG39	1126283	225	286 - 14	823	<p>Gln-1 to Ala-7, Thr-36 to Trp-42, Gly-45 to Gly-52, Glu-77 to Pro-89, Gly-105 to Gly-132, Ser-135 to Glu-162.</p> <p>Arg-27 to Gly-40, Arg-67 to Asp-91.</p>	<p>971347</p> <p>514</p> <p>1121 - 2929</p> <p>1112</p>	<p>H0318: 1, H0581: 1, T0110: 1, H0231: 1, L0738: 1, H0086: 1, H0271: 1, T0006: 1, H0644: 1, H0181: 1, H0124: 1, H0087: 1, T0067: 1, H0560: 1, H0646: 1, L0371: 1, L0800: 1, L0764: 1, L0768: 1, L0803: 1, L0774: 1, L0657: 1, L0368: 1, L0787: 1, L0666: 1, L0663: 1, L0665: 1, H0519: 1, H0414: 1, S0378: 1, S0380: 1, H0696: 1, S0044: 1, S0432: 1, L0439: 1, L0780: 1, L0755: 1, H0445: 1 and L0596: 1.</p>	<p>AR089: 1, AR061: 0 L0659: 12, L0769: 10, L0666: 8, L0747: 8, L0759: 7, L0439: 6,</p>
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L0757: 6, L0756: 5,  
 L0770: 4, L0761: 4,  
 L0663: 4, L0665: 4,  
 H0521: 4, L0749: 4,  
 L0750: 4, L0777: 4,  
 L0758: 4, H0550: 3,  
 H0486: 3, H0544: 3,  
 H0623: 3, L0662: 3,  
 L0794: 3, L0766: 3,  
 L0774: 3, L0664: 3,  
 L0740: 3, L0779: 3,  
 H0423: 3, S0418: 2,  
 S0360: 2, L0717: 2,  
 H0549: 2, H0618: 2,  
 H0581: 2, H0545: 2,  
 H0510: 2, H0617: 2,  
 L0763: 2, L0772: 2,  
 L0642: 2, L0764: 2,  
 L0775: 2, L0655: 2,  
 L0789: 2, S0374: 2,  
 H0658: 2, H0522: 2,  
 H0631: 2, L0745: 2,  
 L0731: 2, H0556: 1,  
 T0049: 1, H0656: 1,  
 L0785: 1, H0483: 1,  
 H0661: 1, H0664: 1,  
 H0662: 1, S0420: 1,  
 S0354: 1, S0358: 1,  
 H0580: 1, S0468: 1,  
 S0132: 1, S0222: 1,  
 H0441: 1, H0586: 1,

	H0587: 1, H0497: 1, H0069: 1, H0427: 1, S0280: 1, H0046: 1, H0457: 1, H0081: 1, H0024: 1, T0010: 1, H0594: 1, H0188: 1, H0687: 1, H0553: 1, H0124: 1, H0494: 1, H0641: 1, S0422: 1, S0002: 1, S0426: 1, L0372: 1, L0646: 1, L0374: 1, L0648: 1, L0649: 1, L0803: 1, L0651: 1, L0653: 1, L0656: 1, L0635: 1, L0542: 1, L0526: 1, L0783: 1, L0809: 1, L0647: 1, L0791: 1, L0792: 1, H0698: 1, H0699: 1, H0693: 1, H0547: 1, H0689: 1, H0690: 1, H0683: 1, H0670: 1, S0378: 1, S0152: 1, H0555: 1, H0436: 1, S0392: 1, L0742: 1, L0751: 1, L0780: 1, H0668: 1, H0653: 1, S0242: 1, H0542: 1, H0543: 1 and S0460: 1.						
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216	HSXBV89	971414	515	1 - 195	1113	Pro-1 to Asn-14, Lys-17 to Phe-23, Met-44 to Tyr-50.	AR054: 23, AR061: 4, AR089: 3, AR050: 0 L0439: 31, L0741: 9, L0438: 7, L0777: 6, H0052: 5, H0617: 5, L0748: 4, L0753: 4, L0769: 3, L0775: 3, L0776: 3, S0378: 3, L0779: 3, S0040: 2, L0103: 2, H0046: 2, H0284: 2, T0006: 2, S0036: 2, S0038: 2, L0351: 2, S0370: 2, L0764: 2, H0670: 2, L0602: 2, L0747: 2, L0592: 2, S0342: 1, S0282: 1, S0030: 1, H0484: 1, S0007: 1, S0278: 1, H0261: 1, S0222: 1, H0441: 1, H0156: 1, T0082: 1, H0194: 1, T0010: 1, S6028: 1, H0271: 1, L0483: 1, H0424: 1, H0213: 1, H0181: 1, S0112: 1, S0144: 1, S0002: 1, L0520: 1,		
		1128699	226	1 - 2037	824	Gln-25 to Gly-33, Pro-49 to Gly-55, Gly-89 to Glu-97, Ser-176 to Glu-183, Thr-231 to Gly-240, Pro-267 to Thr-275, Pro-297 to Asp-308, Asp-340 to Ser-345, Arg-353 to Leu-361, Pro-375 to Gly-382, Glu-393 to Trp-410, Gly-470 to Ser-475, Tyr-504 to Arg-516, Gly-531 to Thr-539, Pro-571 to Gln-580, Leu-591 to Glu-598, Gln-601 to Gly-611, Gly-649 to Ser-654, Asp-661 to Leu-666, Ala-669 to Glu-674.			

												L0762: 1, L0763: 1, L0638: 1, L0772: 1, L0768: 1, L0653: 1, L0659: 1, L0636: 1, L0367: 1, L0791: 1, L0665: 1, L0352: 1, H0672: 1, H0539: 1, S0032: 1, L0742: 1, L0740: 1, L0758: 1 and H0667: 1.		
217	HBIOZ10	971821	516	3 - 509	1114	Gln-20 to Gly-28, Pro-44 to Gly-50.						AR054: 189, AR051: 68, AR050: 35, AR089: 4, AR061: 3 H0593: 1		
		1143756	227	3 - 572	825	Leu-50 to Asp-61, Ser-100 to Leu-107, Pro-119 to Leu-125.								
		973131	517	3 - 503	1115	Leu-50 to Asp-61, Ser-100 to Leu-107, Ala-120 to Thr-130.								
218	HTLEJ11	1085651	228	2 - 802	826	Tyr-52 to Gln-60.						AR061: 3, AR089: 1 H0618: 3 and H0253: 1.		
		973302	518	2 - 802	1116	Tyr-52 to Gln-60, Phe-86 to Ala-94, Lys-111 to Arg-118, His-193 to Tyr-198.								
219	HAWAM69	1207835	229	1 - 1302	827	Val-2 to Cys-17, Cys-41 to Gln-52, Glu-70 to Phe-82, Glu-89 to Ser-97.						AR054: 334, AR050: 251, AR051: 249, AR061: 6, AR089: 6 L0758: 12, L0662: 11.		

Lys-126 to Gly-132, Val-134 to Gly-145, Glu-167 to Arg-180, Glu-187 to Ser-200, Cys-204 to Ser-210, Glu-213 to Asp-221, Thr-260 to Ala-273, Ala-278 to Gln-290, Ser-317 to His-333, Leu-347 to Gly-356, Lys-358 to Phe-363, Leu-367 to Cys-376, Asp-385 to Ser-391, Glu-406 to Gly-434.	H0251: 9, L0731: 9, S0360: 5, H0013: 5, L0659: 5, L0747: 5, H0252: 4, H0328: 4, L0666: 4, L0439: 4, H0135: 3, L0764: 3, L0783: 3, L0749: 3, S0358: 2, L0776: 2, L0663: 2, H0651: 2, L0744: 2, L0754: 2, H0675: 1, H0329: 1, H0619: 1, L0717: 1, H0369: 1, H0550: 1, H0333: 1, H0632: 1, H0486: 1, T0060: 1, H0042: 1, H0575: 1, H0618: 1, H0150: 1, H0123: 1, H0050: 1, H0105: 1, T0003: 1, H0024: 1, H0510: 1, H0594: 1, H0028: 1, H0644: 1, S0364: 1, S0366: 1, H0591: 1, H0100: 1, L0763: 1, L0631: 1, L0637: 1, L0646: 1, L0641: 1, L0644: 1, L0649: 1, L0803: 1, L0775: 1, L0782: 1, L0809: 1, L0519: 1, L0793: 1, L0665: 1, H0144: 1,
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							L0438: 1, H0684: 1, H0672: 1, S0380: 1, L0748: 1, L0759: 1, L0596: 1, L0366: 1, L0600: 1 and H0352: 1.		
							Cys-38 to Gly-43, Gly-70 to Pro-82, Arg-129 to Glu-134, Gly-139 to Gly-144.  Leu-23 to Gly-32, Lys-34 to Lys-40.	1117	
							154 - 2	1118	
220	HCKD11	1056288	230	1238 - 2074	828		Ala-20 to Val-28, Pro-60 to Cys-66, Ser-118 to Asp-123, Leu-225 to Asp-236, Thr-267 to His-274.  Ala-6 to Ala-11, Phe-19 to Asn-24, Val-29 to Lys-34.		AR089: 1, AR061: 1 H0667: 1
		973894	521	117 - 326	1119				
221	HDPLT62	1027241	231	195 - 800	829		Arg-9 to Leu-17, Pro-90 to Asn-95, Lys-115 to Glu-125.		AR089: 1, AR061: 0 H0521: 1
		973945	522	405 - 809	1120				
222	HTPFX16	974296	232	3 - 422	830		Asp-40 to Asn-49, Cys-65 to Gly-71.		AR061: 3, AR089: 2 L0750: 2, H0024: 1, H0039: 1, H0622: 1, H0040: 1 and S0434: 1.
223	HE9NO66	1079624	233	362 - 871	831		Phe-8 to Lys-27, Ser-79 to Ser-87, Cys-102 to Val-116.		AR061: 1, AR089: 1 L0774: 2 and H0144: 2.

224	HSDJI44	974353	523	362 - 871	1121	Phe-8 to Lys-27, Ser-79 to Ser-87, Cys-102 to Val-116.	AR061: 0, AR089: 0 S0045: 6, H0255: 5, S0028: 4, S0031: 2, S0260: 2, H0341: 1, S0278: 1, H0333: 1, H0250: 1, S0050: 1, H0271: 1, H0100: 1, S0216: 1, S0044: 1 and S0390: 1.		
		1154068	234	218 - 1921	832	Ala-324 to Phe-332, Arg-336 to Thr-343, Pro-373 to Arg-384, Lys-424 to Asp-431.			
		974784	524	210 - 1847	1122	Ala-324 to Phe-332, Arg-336 to Thr-343, Pro-373 to Arg-384, Lys-424 to Asp-431.			
225	HFXDP53	1126294	235	1 - 435	833	Gln-16 to Gly-25, Thr-32 to Gly-42, Asn-46 to Asp-52.	AR061: 3, AR089: 1 S0001: 1		
		578868	525	3 - 272	1123	Lys-1 to Arg-7, Phe-10 to Arg-19.			
226	HWADY66	734565	236	1 - 186	834		AR061: 1, AR089: 1 H0581: 1, H0494: 1, H0521: 1, H0444: 1, H0543: 1 and L0465: 1.		
227	HLDBC63	1144557	237	3 - 662	835	Phe-61 to Thr-68, Arg-70 to Ser-76, Gln-88 to Arg-93, Pro-145 to Gln-157, Glu-164 to Ser-171,	AR061: 10, AR089: 4 L0754: 4, H0616: 1 and H0509: 1.		

[illegible]



231	HCFMT57	1218436	241	3 - 1115	839		Ser-4 to Arg-15, Glu-20 to Arg-62, Pro-107 to Gly-112, Gly-128 to Gly-134, Gln-137 to Arg-143, Ala-191 to Ala-212, Tyr-239 to Asn-247, Leu-300 to Pro-328, Pro-337 to Lys-350, Ser-356 to Leu-361, Gly-366 to Glu-371.	H0135: 1, L0770: 1, L0769: 1, L0776: 1, L0745: 1, L0777: 1 and L0753: 1.		
							Glu-5 to Arg-15, Glu-20 to Arg-62.	AR061: 0, AR089: 0 L0157: 2, H0620: 2, L0666: 2, S0001: 1, L0717: 1, H0549: 1, S0222: 1, H0581: 1, H0194: 1, H0015: 1, H0399: 1, H0271: 1, H0688: 1, H0428: 1, H0124: 1, L0637: 1, H0672: 1, L0439: 1, L0750: 1 and H0423: 1.		
232	HDAAV61	1188787	242	1 - 1332	840		Asp-34 to Asp-49, Gly-276 to Ala-286, Ile-298 to Tyr-303, Leu-390 to Arg-395.	AR089: 25, AR061: 11 L0601: 5, H0266: 4, S0222: 3, H0265: 2, H0556: 2, H0575: 2, H0052: 2, H0271: 2, S0114: 1, S0134: 1, S0420: 1, H0393: 1, H0550: 1, H0497: 1, H0318: 1, H0581: 1, H0251: 1, T0115: 1, H0014: 1, H0286: 1, H0494: 1, H0561: 1, L0766: 1, L0657: 1,		

									H0698: 1, H0684: 1, S0330: 1, H0521: 1, S3014: 1, L0777: 1, S0260: 1, L0591: 1, L0594: 1 and H0543: 1.		
233	HDPKD75					530	2 - 343	1128	Asp-90 to Lys-105.		
		810305				243	2 - 637	841	Gly-2 to Asp-11, Ala-23 to Asn-30, Phe-48 to Gly-56, Glu-99 to His-105, Glu-187 to Glu-192.	AR089: 4, AR061: 0 H0581: 1, H0494: 1, H0521: 1, H0543: 1 and L0465: 1.	
		1096253									
		810824				531	2 - 445	1129	Ala-13 to Asn-20, Phe-38 to Gly-46, Glu-89 to His-95.		
234	HTEON29					244	1 - 516	842	Pro-27 to Ala-35, Ser-138 to Asn-144.	AR061: 6, AR089: 3 H0038: 4, L0758: 3, H0616: 2, L0794: 2, L0747: 2, L0803: 1, L0789: 1 and L0590: 1.	
		1126312									
		815852				532	2 - 520	1130	Pro-27 to Ala-35.		
235	HSKAC24					245	1 - 480	843	Ala-3 to Arg-20, Ser-33 to Asp-39, Leu-70 to Ser-76, Pro-117 to Tyr-122.	AR061: 2, AR089: 1 H0370: 2, S0002: 1, S0428: 1 and S0027: 1.	
		1121800									
		823869				533	98 - 481	1131	Ser-1 to Asp-7, Leu-38 to Ser-44, Pro-85 to Tyr-90.		
236	HTJAA71					246	25 - 1029	844	Arg-32 to Asn-39, Leu-76 to Gly-82, Cys-112 to Ser-119,	AR089: 5, AR061: 4 S0328: 5, H0264: 4, L0549: 3, S0306: 2,	
		1216498									

						Gly-129 to Gly-135, Ala-141 to Val-167, Ser-181 to Ile-194, Ser-201 to Gly-239, Ser-245 to Gln-250, Thr-256 to Thr-293, Ala-306 to Asp-335.		H0379: 1, H0487: 1, S0448: 1, S0450: 1, L0648: 1, L0551: 1 and S0330: 1.		
237	HTEKS20	846682	534	23 - 334	1132	Arg-32 to Asn-39.		AR061: 2, AR089: 1 L0758: 14, H0038: 5, L0779: 4, L0794: 2 and H0616: 1.		
		1124378	247	2 - 562	845	Pro-7 to Arg-12, Phe-32 to Ile-37, Arg-39 to Lys-45, Leu-47 to Gly-53, Lys-102 to Lys-108, Asp-117 to Gly-122.				
		846714	535	3 - 569	1133	Pro-9 to Arg-14, Phe-34 to Ile-39, Arg-41 to Lys-47, Leu-49 to Gly-55, Lys-104 to Lys-110, Asp-119 to Gly-124.				
238	HE9TK49	1125192	248	3 - 863	846	Glu-134 to Glu-144, Gln-151 to Arg-161, Arg-167 to Gly-172, Tyr-183 to Asn-188, Asn-193 to Phe-209, Asp-261 to Trp-272.		AR061: 3, AR089: 1 H0144: 2 and S0053: 1.		
		856343	536	2 - 328	1134					
239	HCHAT01	1202275	249	2 - 2269	847	Glu-75 to Glu-86, Leu-176 to Gln-181, Ser-276 to Ala-282,		AR089: 1, AR061: 0 L0439: 12, L0748: 11, L0751: 11, L0769: 7,		

Leu-320 to Lys-325, Met-366 to Ser-373, Leu-414 to Asp-419, Thr-471 to His-506, Lys-513 to Ile-522, Pro-526 to Gln-532, Asp-547 to Asp-552, Ala-576 to Cys-585, Glu-588 to His-598, Gly-637 to Pro-645, Leu-649 to Asp-657, Ile-733 to Phe-743, Ala-746 to Gly-753.	H0046: 6, L0756: 6, L0775: 5, L0666: 5, L0747: 5, L0770: 4, L0438: 4, L0740: 4, L0777: 4, H0617: 3, L0662: 3, L0774: 3, L0776: 3, H0521: 3, S0037: 3, L0749: 3, L0731: 3, L0757: 3, L0758: 3, S0212: 2, S0222: 2, H0586: 2, H0587: 2, H0333: 2, H0156: 2, H0052: 2, S0388: 2, H0290: 2, L0640: 2, L0521: 2, L0766: 2, L0375: 2, L0659: 2, L0783: 2, H0144: 2, H0539: 2, L0755: 2, H0445: 2, L0596: 2, L0599: 2, H0149: 1, S0342: 1, H0294: 1, S0114: 1, H0484: 1, H0483: 1, H0664: 1, H0638: 1, S0418: 1, S0420: 1, L0005: 1, S0046: 1, S0300: 1, H0549: 1, H0550: 1, H0370: 1, H0497: 1, H0331: 1, H0486: 1, H0575: 1, S0010: 1, H0434: 1.
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240	HCEEN06	867209	537	771 - 1556	1135	Ser-20 to Ala-26, Leu-64 to Lys-69, Met-110 to Ser-117, Leu-158 to Asp-163.	AR089: 6, AR061: 3 L0666: 6, L0761: 4, H0486: 3, L0794: 3, L0659: 3, H0255: 2, S0358: 2, H0052: 2, L0809: 2, L0743: 2, L0759: 2, H0692: 1, S0116: 1, H0581: 1, H0597: 1, L0055: 1, H0087: 1, L0763: 1, L0800: 1, L0644: 1, L0764: 1, L0766: 1, L0375: 1, L0655: 1, L0788: 1, L0663: 1, S0310: 1, H0672: 1, S0328: 1, H0539: 1 and H0436: 1.		
		1150867	250	128 - 664	848	Pro-7 to Pro-14, Asp-70 to Arg-80, Asp-145 to Gln-152.			
		878658	538	2 - 619	1136	Ser-1 to Ala-10, Cys-23 to Ala-29.			
241	HDPKI83	883382	251	101 - 673	849	Pro-19 to Lys-29, His-38 to Phe-45, Ile-52 to Gln-66, Glu-123 to Glu-138.	AR061: 3, AR089: 3 H0521: 7, H0580: 5, L0665: 4, H0457: 3, L0766: 3, L0745: 3, L0761: 2, L0806: 2, L0789: 2, L0750: 2, H0542: 2, H0650: 1,		

242	HSPBQ12	1152258	252	1 - 588	850	His-4 to Gly-21, Thr-55 to Ser-66, Pro-118 to Gly-130, Thr-168 to Ser-174.	<p>H0656: 1, H0581: 1, H0271: 1, H0553: 1, H0413: 1, H0641: 1, S0002: 1, L0774: 1, H0660: 1, H0555: 1, L0753: 1 and H0423: 1.</p> <p>AR089: 2, AR061: 1 L0766: 19, L0439: 9, L0803: 7, L0740: 7, L0752: 7, L0770: 5, L0659: 5, L0731: 5, L0805: 4, L0777: 4, H0657: 3, H0373: 3, L0804: 3, S0152: 3, L0748: 3, L0749: 3, L0779: 3, H0650: 2, L0471: 2, S6028: 2, H0032: 2, L0783: 2, L0438: 2, H0521: 2, H0478: 2, L0744: 2, L0747: 2, L0750: 2, L0485: 2, S0424: 2, S0134: 1, S0354: 1, S0358: 1, H0580: 1, S0222: 1, H0013: 1, L0021: 1, H0575: 1, H0050: 1, H0014: 1, H0051: 1, H0031: 1, H0553: 1, H0165: 1, H0551: 1, H0509: 1,</p>		
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243	HPCID78	884004 886915	539 253	91 - 1287 1 - 429	1137 851	Gly-1 to Cys-7.	AR054: 2, AR051: 1, AR089: 1, AR061: 0 H0642: 1		
244	HDTKQ14	886936	254	1 - 555	852	Ser-60 to Thr-71, Thr-82 to Leu-94, Gln-113 to Asp-123, Val-125 to Tyr-133, Leu-144 to Gly-149.	AR054: 60, AR051: 40, AR050: 36, AR089: 5, AR061: 2 H0521: 4, H0486: 2, S0002: 2, L0770: 2, L0769: 2, L0766: 2, L0518: 2, L0783: 2,		



245	HRACK83	888037	255	1 - 471	853	Gln-15 to Gln-21.	L0777: 2, L0731: 2, H0422: 2, H0556: 1, H0583: 1, H0650: 1, H0657: 1, H0179: 1, L0055: 1, H0488: 1, S0426: 1, L0662: 1, L0775: 1, L0655: 1, L0665: 1, S0053: 1, H0659: 1, L0754: 1, L0779: 1, L0759: 1 and H0543: 1. AR089: 3, AR061: 2 L0803: 4, L0758: 3, S0212: 2, S0358: 2, H0038: 2, L0770: 2, L0767: 2, L0766: 2, L0748: 2, L0751: 2, L0747: 2, L0759: 2, L0588: 2, L0599: 2, H0411: 1, H0392: 1, H0333: 1, L0021: 1, H0118: 1, T0115: 1, L0471: 1, L0163: 1, H0633: 1, L0769: 1, L0764: 1, L0775: 1, L0376: 1, L0806: 1, L0805: 1, L0807: 1, L0787: 1, H0547: 1, S0122: 1, H0555: 1, H0478: 1, L0744: 1,		
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246	HSIAO78	1156438	256	2 - 631	854	Met-15 to Ser-20, Asp-27 to Phe-37, Asp-53 to Tyr-59, Pro-86 to Asp-93, Pro-106 to Lys-129, Leu-139 to Ser-146, Thr-174 to Asp-183.	AR089: 1, AR061: 0 S0354: 3, S0358: 3, H0587: 3, L0764: 3, L0803: 3, L0758: 3, H0036: 2, L0794: 2, L0809: 2, S0374: 2, S0376: 1, S0444: 1, S0408: 1, H0231: 1, L0783: 1, L0777: 1 and L0759: 1.	L0740: 1, L0749: 1, L0750: 1, L0755: 1 and L0595: 1.		
		889498	540	2 - 622	1138	Asp-24 to Phe-34, Asp-50 to Tyr-56, Pro-83 to Asp-90, Pro-103 to Lys-126, Leu-136 to Ser-143, Thr-171 to Asp-180.				
247	HWAGS73	894404	257	1 - 339	855	Val-14 to Lys-21, Gln-41 to Trp-46, Ala-98 to Pro-103.	AR089: 2, AR061: 2 H0581: 3, H0622: 3, H0575: 2, H0090: 2, L0777: 2, L0757: 2, S0114: 1, H0650: 1, H0255: 1, S0360: 1, S0278: 1, H0486: 1, H0318: 1, H0046: 1, H0457: 1, H0039: 1, H0553: 1, L0763: 1, L0761: 1, L0764: 1,			

[illegible]

248	HCMSL08	898203	258	1 - 1221	856	Gly-1 to Thr-10, Ala-14 to Gly-19, Pro-52 to Val-57, Pro-85 to Gln-95, Lys-198 to His-204, Pro-254 to Glu-260, Glu-269 to Ser-282, Glu-302 to Gly-307, Asp-320 to Asp-326, Asp-373 to Ser-380, Ile-396 to Asp-407.	Lys-59 to His-65, Pro-115 to Glu-121, Glu-130 to Ser-143.	L0789: 1, H0144: 1, S0374: 1, S0310: 1, H0555: 1, L0758: 1, H0445: 1 and S0276: 1. AR051: 86, AR054: 73, AR050: 67, AR089: 10, AR061: 5 H0706: 8, S0366: 5, S0364: 4, L0485: 4, L0604: 4, L0777: 3, L0623: 2, S0362: 2, H0373: 2, L0520: 2, L0747: 2, H0624: 1, H0619: 1, H0550: 1, H0196: 1, L0646: 1, L0809: 1, H0693: 1, S0328: 1 and H0214: 1.	104770, 107670, 110700, 135940, 145001, 146790, 152445, 152445, 159001, 174000, 179755, 182860, 182860, 182860, 191315, 230800, 230800, 266200, 600897, 601105, 601412, 601652, 602491
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249	HLWFN63	1101533	259	404 - 2566	857	Glu-163 to Gly-168, Asp-181 to Asp-187, Asp-234 to Ser-241, Ile-257 to Asp-268.  Thr-7 to Phe-29, Thr-37 to Lys-52, Glu-89 to Val-112.	AR051: 11, AR050: 9, AR054: 5, AR089: 0, AR061: 0 H0031: 5, S0222: 4, S0028: 4, H0662: 3, L0748: 3, S0260: 3, S0276: 3, S0282: 2, S0360: 2, S0046: 2, H0575: 2, H0196: 2, S0036: 2, H0268: 2, L0662: 2, S0027: 2, L0754: 2, L0747: 2, L0749: 2, L0756: 2, L0777: 2, L0604: 2, L0595: 2, H0171: 1, S0030: 1, S0029: 1, S0358: 1, H0619: 1, S0300: 1, L0717: 1, H0550: 1, H0441: 1, H0431: 1, H0392: 1, T0060: 1, S0010: 1, H0052: 1, H0309: 1, S6028: 1, S0250: 1, H0252: 1, H0553: 1, S0364: 1, S0366: 1, H0433: 1, H0269: 1,		
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250	HPWAY10	908437	542	404 - 2566	1140	Thr-7 to Phe-29, Thr-37 to Lys-52, Glu-89 to Val-112.	Gly-1 to Trp-7, Leu-11 to Phe-21, Glu-46 to His-52, Val-59 to Leu-73, Tyr-79 to Cys-91, His-111 to Tyr-117, Ser-133 to Lys-149, His-167 to Tyr-173, His-195 to Tyr-201, His-251 to Lys-257.	AR089: 1, AR061: 0 H0341: 1, H0013: 1 and S0044: 1.			
251	HOUDH19	908549	543	149 - 466	1141	Cys-36 to Asn-43, Gln-74 to Trp-79.		AR089: 1, AR061: 0 S0040: 1, H0250: 1, T0048: 1, L0761: 1, L0764: 1, L0783: 1, L0809: 1, L0789: 1 and			
		1153909	261	3 - 404	859	Ser-2 to Gln-12, Cys-14 to Met-19, Ser-34 to Leu-41, Pro-43 to Leu-48, Glu-89 to Asp-111,					

252	HDPFF24	908588	544	52 - 573	1142	Ile-125 to Lys-134. Thr-8 to Gln-19, Lys-26 to Glu-33, Lys-41 to Ile-50.	L0757: 1.		
		1194719	262	124 - 1317	860	Ser-38 to Tyr-44, Glu-72 to Pro-77, Asp-91 to Pro-113, Gln-124 to Asn-134, Ser-182 to Ile-190, Glu-215 to Gly-220, Leu-223 to Ser-229, Gln-243 to Ile-250, His-273 to His-290, His-301 to Lys-308, Thr-323 to Glu-336, Met-338 to Ser-343, Thr-358 to Tyr-363, His-385 to Asn-398.	AR089: 4, AR061: 1 H0171: 5, S0026: 3, S0400: 2, L0471: 2, H0031: 2, H0553: 2, H0547: 2, H0521: 2, L0759: 2, H0423: 2, H0170: 1, H0583: 1, H0656: 1, S0001: 1, S0358: 1, S0360: 1, H0244: 1, H0349: 1, H0590: 1, H0310: 1, H0014: 1, H0039: 1, S0366: 1, H0551: 1, L0351: 1, H0509: 1, S0150: 1, L0369: 1, L0796: 1, L0773: 1, L0662: 1, L0766: 1, L0803: 1, L0635: 1, L0540: 1, H0519: 1, H0684: 1, H0660: 1, H0666: 1, S0044: 1, H0478: 1, H0479: 1, H0626: 1, L0748: 1, L0740: 1, L0777: 1, L0752: 1, L0755: 1 and H0543: 1.		

253	HWLFH94	909232	545	104 - 460	1143	Glu-20 to Gly-25, Gln-36 to Ser-48, Ser-56 to Val-62.	AR089: 5, AR061: 2 S0358: 5, L0596: 3, L0771: 2, L0758: 2, S0354: 1, S0376: 1, T0109: 1, H0036: 1, H0590: 1, L0040: 1, H0038: 1, H0616: 1, L0646: 1, L0764: 1, L0768: 1, L0775: 1, L0659: 1 and S0404: 1.		
		1152278	263	589 - 951	861				
		909682	546	134 - 535	1144	Ser-25 to Ala-52, Phe-64 to Glu-71.			
254	HWMBM13	1152283	264	3 - 557	862	Pro-17 to Ala-41, Phe-53 to Glu-60, Glu-84 to Gly-89, Gln-100 to Ser-112, Ser-120 to Val-126.	AR089: 2, AR061: 2 S0358: 6, L0794: 4, L0758: 4, S0354: 3, L0779: 3, L0596: 3, S0376: 2, H0036: 2, H0620: 2, H0063: 2, L0771: 2, L0803: 2, L0654: 2, L0659: 2, T0109: 1, H0013: 1, H0590: 1, H0052: 1, H0596: 1, T0110: 1, L0040: 1, H0090: 1, H0038: 1, H0040: 1, H0616: 1, H0429: 1, H0561: 1, L0646: 1, L0764: 1, L0768: 1, L0766: 1, L0775: 1,		

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		909683	547	3 - 539	1145	Pro-11 to Ala-35, Phe-47 to Glu-54, Glu-78 to Gly-83, Gln-94 to Ser-106, Ser-114 to Val-120.				AR089: 1, AR061: 1 L0748: 5, S0242: 3, H0615: 2, S0376: 1, S0360: 1, L0717: 1, L0641: 1, L0766: 1, L0664: 1, H0478: 1, L0593: 1 and S0196: 1.	
255	HFIUE75	1172525	265	79 - 1290	863	His-22 to Ile-35, Phe-39 to Glu-47, Asp-65 to Ser-76, Ser-82 to Lys-89, Met-93 to Ser-98.					
		909758	548	2 - 775	1146	Cys-1 to Val-10, Ala-14 to Met-22.					
256	HNTCP13	1182313	266	1 - 957	864	Leu-6 to Tyr-15, Ser-48 to Phe-53, Asn-66 to Ser-71, Asp-101 to Pro-111, Gln-116 to Glu-124, Arg-203 to Asp-212.				AR061: 3, AR089: 2 L0750: 4, H0519: 3, L0666: 2, L0565: 2, H0539: 2, L0742: 2, L0744: 2, L0754: 2, L0777: 2, L0759: 2, H0662: 1, S0045: 1, S0346: 1, H0251: 1, H0030: 1, H0628: 1, H0674: 1, H0529: 1, L0770: 1, L0764: 1, L0526: 1, L0783: 1,	



									L0787: 1, H0547: 1, H0521: 1, H0696: 1, H0555: 1, L0747: 1, L0749: 1, L0786: 1, L0779: 1, L0780: 1, L0752: 1 and L0592: 1.		
257	HBIBQ89	909770	549	1 - 960	1147				Gly-35 to Asp-41, Phe-113 to Met-119, Pro-164 to Glu-170, Val-173 to Gly-178, Met-180 to Glu-190, Thr-192 to Gln-199, His-206 to Glu-211, Arg-244 to Ile-257.	AR089: 1, AR061: 0 L0438: 6, L0751: 6, L0439: 5, L0770: 4, H0052: 2, H0620: 2, H0521: 2, L0756: 2, L0731: 2, L0758: 2, L0588: 2, H0556: 1, S0282: 1, H0662: 1, H0402: 1, S0418: 1, T0008: 1, S0222: 1, H0392: 1, H0333: 1, L0021: 1, H0581: 1, S0049: 1, L0471: 1, H0266: 1, L0351: 1, L0772: 1, L0766: 1, L0776: 1, L0659: 1, L0792: 1, H0522: 1, S0027: 1, L0779: 1 and S0011: 1.	
		1175111	267	3 - 824	865						
258	HWBEG18	909782	550	2 - 577	1148				Leu-42 to Ile-47.  Trp-46 to Lys-51,	AR089: 82, AR061: 18 H0580: 1	
		1169125	268	439 - 161	866						
		909798	551	55 - 696	1149						

259	HTAHB43	1221956	269	3 - 2174	867	Pro-109 to Asn-123, Phe-156 to Gly-165.	AR089: 1, AR061: 0 H0046: 34, L0731: 5, L0534: 4, L0769: 4, H0521: 4, S0356: 3, L0800: 3, L0794: 3, L0439: 3, L0749: 3, L0752: 3, L0759: 3, L0562: 2, H0486: 2, L0803: 2, L0805: 2, L0809: 2, L0789: 2, L0744: 2, L0485: 2, H0556: 1, H0657: 1, H0637: 1, H0580: 1, H0208: 1, H0261: 1, H0609: 1, H0455: 1, H0600: 1, H0586: 1, H0331: 1, H0635: 1, H0618: 1, H0544: 1, H0009: 1, H0050: 1, H0620: 1, H0288: 1, S0312: 1, S0314: 1, H0252: 1, H0688: 1, H0644: 1, S0366: 1, H0135: 1, H0063: 1, H0087: 1, H0551: 1, H0264: 1, S0002: 1, L0639: 1, L0771: 1, L0648: 1, L0766: 1,		
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									H0135: 1, H0063: 1, H0087: 1, H0551: 1, H0264: 1, S0002: 1, L0639: 1, L0771: 1, L0648: 1, L0766: 1, L0650: 1, L0378: 1, L0655: 1, H0699: 1, H0660: 1, L0743: 1, L0750: 1, L0777: 1, L0758: 1, L0097: 1, S0194: 1 and H0543: 1.			
261	HCEHE35	1124531	271	2 - 550	869	Arg-1 to Pro-15, Asn-17 to Leu-25, Glu-27 to Pro-36, Pro-41 to Pro-55, Glu-58 to Gln-79.			AR061: 8, AR089: 3 S0222: 1, H0052: 1, H0194: 1, H0290: 1 and H0264: 1.			
		909937	553	3 - 392	1151	Asn-6 to Pro-13.						
262	HFCBB56	1204971	272	112 - 753	870	Thr-37 to Ser-42, Gln-48 to Pro-55, Ser-75 to Ala-80, Ser-95 to Val-111, Gln-113 to Gly-124, Glu-153 to Gly-161, Tyr-188 to Asp-193.			AR061: 1, AR089: 1 H0009: 1			
		910073	554	209 - 565	1152							
263	HAMFL82	910074	273	3 - 317	871	Glu-20 to Val-26.			AR089: 9, AR061: 4 H0229: 1, H0590: 1, S0049: 1, H0014: 1, H0560: 1, L0439: 1 and H0543: 1.			

264	HBXCM38	1174533	274	402 - 1349	872		AR061: 2, AR089: 1 L0439: 6, S0038: 3, L0803: 3, H0455: 2, L0769: 2, L0809: 2, L0741: 2, L0756: 2, S6024: 1, S0001: 1, H0663: 1, S0222: 1, H0441: 1, H0438: 1, H0036: 1, S0049: 1, H0309: 1, H0566: 1, H0024: 1, S0388: 1, S0051: 1, T0010: 1, H0059: 1, L0645: 1, L0774: 1, L0790: 1, L0663: 1, L0665: 1, H0345: 1, L0742: 1, L0748: 1, L0749: 1, H0707: 1, L0595: 1 and L0366: 1.	
		910086	555	402 - 1535	1153	Val-36 to Glu-43, Lys-66 to Glu-71.		
265	HLHCR16	910123	275	2 - 3418	873	Pro-9 to Pro-15, Gly-49 to Trp-54, Ser-91 to Phe-96, Thr-109 to Asp-115, Cys-124 to Ile-130, Cys-164 to Trp-169, Thr-193 to Asp-207, Thr-215 to Tyr-220, Thr-228 to Ser-240,	AR050: 9, AR061: 2, AR054: 2, AR089: 2, AR051: 2 L0754: 14, L0777: 13, H0553: 10, L0600: 7, L0748: 6, L0803: 4, L0749: 4, UNKWN: 4, H0624: 3, S0280: 3, S0126: 3, L0747: 3,	

					Glu-269 to Ser-276, Glu-327 to Ala-334, Asn-376 to Asp-392, Gln-420 to Asn-428, Tyr-547 to Ser-566, Ala-616 to Gly-623, Pro-625 to Ser-631, Ser-647 to Val-653, Gly-676 to Pro-681, Tyr-720 to Glu-740, Ile-742 to Lys-748, Asp-792 to Cys-804, Leu-841 to Val-848, Gln-850 to Gly-857, Asp-879 to Gly-886, His-906 to Trp-913, Pro-968 to Thr-975, Gln-1051 to Ser-1057, Pro-1092 to Cys-1099, Lys-1113 to Cys-1120, Trp-1126 to Phe-1139.			S0282: 2, H0024: 2, H0030: 2, H0031: 2, H0040: 2, L0438: 2, S0028: 2, L0743: 2, L0596: 2, L0603: 2, S0212: 1, H0270: 1, H0244: 1, H0427: 1, H0251: 1, H0309: 1, S0338: 1, S0340: 1, S0250: 1, H0252: 1, H0039: 1, L0143: 1, H0038: 1, L0659: 1, L0565: 1, H0593: 1, H0684: 1, H0518: 1, S0390: 1, S0260: 1 and H0506: 1.	
965511	556	2 - 1492	1154	Pro-9 to Pro-15, Gly-49 to Trp-54, Ser-91 to Phe-96, Thr-109 to Asp-115, Cys-124 to Ile-130, Cys-164 to Trp-169, Thr-193 to Asp-207, Thr-215 to Tyr-220, Thr-228 to Ser-240.					

266	HE6GF02	1153883	276	1 - 612	874	Glu-269 to Ser-276, Glu-327 to Ala-334, Asn-376 to Asp-392, Gln-420 to Asn-428.	AR061: 7, AR089: 4 H0100: 1 and H0521: 1.		
		911263	557	1 - 264	1155	Gln-13 to Ser-18, Glu-32 to Gly-37, Ala-44 to Trp-49, Glu-56 to Val-61, Gln-68 to Lys-74, Ala-83 to Glu-88, Arg-111 to Gly-117, Tyr-123 to His-143, Ser-167 to Met-201.			
267	HOUFT36	1162680	277	853 - 1563	875	Thr-70 to Ala-83, Gly-105 to Asn-110, Ser-181 to Val-187.	AR089: 2, AR061: 1 L0794: 6, L0598: 2, L0803: 2, L0748: 2, S0040: 1, S0046: 1, H0431: 1, H0318: 1, L0766: 1, L0606: 1, L0749: 1, L0758: 1 and S0192: 1.		
		911293	558	160 - 846	1156	Lys-27 to Ile-43.			
268	HAGGF84	1197460	278	415 - 1530	876	Arg-24 to Arg-30, Arg-39 to Tyr-44, Lys-78 to Glu-91, Val-215 to Lys-223.	AR061: 3, AR089: 2 L0766: 18, L0748: 11, L0439: 9, L0749: 8, L0438: 5, L0750: 5, L0777: 4, L0759: 4,		

H0441: 3, H0052: 3,  
 L0637: 3, L0761: 3,  
 L0740: 3, L0747: 3,  
 L0103: 2, H0574: 2,  
 H0156: 2, H0597: 2,  
 S0250: 2, L0649: 2,  
 L0803: 2, L0806: 2,  
 L0792: 2, S3014: 2,  
 L0757: 2, L0485: 2,  
 L0599: 2, H0171: 1,  
 S6024: 1, L0002: 1,  
 H0657: 1, H0341: 1,  
 S0358: 1, S0360: 1,  
 S0132: 1, L0717: 1,  
 H0632: 1, H0013: 1,  
 H0599: 1, S0010: 1,  
 S0346: 1, H0318: 1,  
 H0251: 1, T0115: 1,  
 H0544: 1, L0471: 1,  
 H0014: 1, S0362: 1,  
 H0083: 1, H0188: 1,  
 H0428: 1, H0646: 1,  
 H0538: 1, L0598: 1,  
 L0762: 1, L0763: 1,  
 L0769: 1, L0662: 1,  
 L0768: 1, L0776: 1,  
 L0655: 1, L0659: 1,  
 L0526: 1, L0783: 1,  
 L0789: 1, L0665: 1,  
 S0148: 1, H0520: 1,  
 H0519: 1, S0330: 1,



								L0602: 1, S0152: 1, S0136: 1, S0350: 1, L0752: 1, H0343: 1, L0366: 1, S0011: 1, H0665: 1, S0196: 1, H0423: 1, L0697: 1 and S0462: 1.		
								Lys-14 to Glu-27.		
269	HTTKP07		911312	559	1 - 333	1157	877	Thr-15 to Asp-25, Glu-69 to Leu-89, Glu-130 to Arg-137.	AR089: 1, AR061: 1 H0634: 2	
			1119031	279	2 - 571					
			911390	560	2 - 337	1158		Thr-15 to Asp-25, Glu-69 to Leu-89.		
270	HE9SE62		1171014	280	718 - 212	878			AR061: 16, AR089: 6 L0804: 1, S0052: 1, H0144: 1 and H0659: 1.	
			911476	561	1 - 564	1159				
271	HUJAD24		1162674	281	788 - 1255	879		Gln-49 to Thr-69, His-129 to Cys-143.	AR089: 1, AR061: 0 L0750: 3, H0650: 2, H0637: 2, H0265: 1, H0556: 1, S0222: 1, H0040: 1, H0280: 1, L0655: 1, L0789: 1 and L0666: 1.	
			911498	562	3 - 293	1160				
272	HWLFG75		1228123	282	1 - 819	880		Val-15 to Gly-26, Pro-43 to Ala-64, Arg-75 to Gly-82, Thr-115 to Thr-120, Leu-215 to Gly-222,	AR089: 1, AR061: 0 L0439: 7, L0770: 4, L0771: 4, L0779: 4, H0688: 3, H0617: 2, L0533: 2, L0803: 2,	

273	HT3BG12					Ser-230 to Trp-235, Pro-237 to Ala-248.	L0807: 2, L0791: 2, L0666: 2, H0539: 2, H0624: 1, S0400: 1, H0125: 1, H0192: 1, S0356: 1, S0354: 1, S0376: 1, S0360: 1, S0278: 1, H0550: 1, H0333: 1, S0049: 1, H0205: 1, S0051: 1, L0142: 1, L0455: 1, L0769: 1, L0794: 1, L0658: 1, L0540: 1, L0518: 1, L0809: 1, L0663: 1, H0689: 1, S0332: 1, H0214: 1, S3014: 1, L0747: 1, L0749: 1, L0758: 1, S0260: 1 and S0458: 1.		
		916563	563	1 - 750	1161	Val-10 to Gly-21, Pro-38 to Ala-59, Arg-70 to Gly-77, Thr-110 to Thr-115, Leu-210 to Gly-217, Ser-225 to Trp-230, Pro-232 to Arg-239.		AR061: 8, AR089: 3 L0758: 3, H0159: 2, S0001: 1, H0618: 1, H0660: 1 and L0779: 1.	
		1092417	283	9 - 785	881				
		921593	564	1 - 381	1162	Glu-1 to Ala-15,			

274	HTLJC71	922923	284	3 - 1355	882	Lys-25 to Ser-32, Asp-45 to Thr-51, Pro-59 to Pro-65, Pro-78 to Ser-85. His-1 to Phe-9, Cys-13 to Thr-18, Pro-35 to Gly-48, Glu-61 to Pro-68, Lys-105 to Ala-136, Thr-144 to Gln-154, Leu-163 to Gly-171, Thr-205 to Gln-222, Pro-251 to Gln-257.	AR061: 7, AR089: 5 H0618: 12, H0253: 8, H0038: 6, L0758: 6, L0779: 5, H0616: 3, T0041: 1, L0776: 1, S0274: 1 and H0543: 1.			
275	HCOMM05	1194701	285	2 - 850	883	Gln-22 to Asp-41, Pro-49 to Thr-58, Leu-99 to Gly-107, Ala-117 to Ala-122, Gln-128 to Trp-134, Pro-136 to Pro-144, Phe-147 to Glu-153, Glu-183 to Val-188, Glu-195 to Glu-200, Glu-257 to Leu-265, Met-275 to Ser-283.	AR089: 1, AR061: 1 H0670: 1			
		925952	565	1 - 840	1163	Gln-19 to Asp-38, Pro-46 to Thr-55, Leu-96 to Gly-104, Ala-114 to Ala-119, Gln-125 to Trp-131, Pro-133 to Pro-141,				

276	HSLJE54	1229928	286	650 - 1654	884	Phe-144 to Glu-150, Glu-180 to Val-185, Glu-192 to Glu-197, Glu-254 to Leu-262, Met-272 to Ser-280.	AR061: 0, AR089: 0 S0036: 1, H0521: 1, H0436: 1 and S0390: 1.		
						Ala-17 to Val-30, Thr-32 to Arg-39, Arg-55 to Ser-60, Ala-213 to Leu-219, Glu-236 to Glu-241, Ser-262 to Tyr-272, Pro-299 to Asn-305.			
		926924	566	3 - 731	1164	Arg-1 to Gly-7, Pro-25 to His-34, Leu-36 to Lys-49.			
277	HTGED07	927411	287	16 - 483	885	Lys-35 to Asn-46.	AR089: 33, AR061: 7		
278	HOFNH30	928365	288	3 - 320	886		AR089: 4, AR061: 2 H0415: 13, H0414: 2, H0355: 1, H0517: 1 and H0539: 1.		
279	HWNCY05	1179767	289	1 - 981	887	Lys-15 to Gly-23, Glu-36 to His-47.	AR061: 2, AR089: 1 H0656: 2, S0360: 2, H0657: 1, H0662: 1, S0420: 1, S0356: 1, S0358: 1, S0132: 1, H0392: 1, S0022: 1, H0144: 1, H0520: 1, H0659: 1, H0658: 1, H0660: 1, H0672: 1,		

									S0380: 1, L0602: 1, H0653: 1 and H0677: 1.		
	928789	567	3 - 1319	1165	Lys-11 to Gly-19, Glu-32 to His-43, Lys-60 to Glu-66, Pro-86 to Lys-98, Lys-118 to Leu-128, Thr-142 to Trp-148.						
280	HDPDA47	929193	290	103 - 906	888	Arg-17 to Leu-34, Asp-44 to Ser-51, Asp-63 to Gly-72, Pro-74 to Gly-83, Thr-97 to Met-102.			AR089: 11, AR061: 3 H0521: 7, H0581: 3, H0422: 3, H0650: 2, H0486: 2, S0002: 2, L0770: 2, L0769: 2, L0766: 2, L0518: 2, L0783: 2, L0777: 2, L0731: 2, H0445: 2, H0556: 1, H0583: 1, H0657: 1, H0656: 1, H0341: 1, H0575: 1, H0457: 1, H0179: 1, H0271: 1, L0055: 1, H0264: 1, H0488: 1, S0426: 1, L0662: 1, L0775: 1, L0655: 1, L0665: 1, S0053: 1, H0702: 1, H0701: 1, H0659: 1, L0754: 1, L0779: 1, L0759: 1 and H0543: 1.		
281	HWMEV63	931154	291	2 - 454	889	His-9 to Asn-26,			AR089: 1, AR061: 1	3q21-q25	106165,

						Pro-47 to Ser-61, Arg-116 to Thr-122.	S0358: 1 and H0580: 1.		117700, 117700, 150210, 169600, 180380, 180380, 180380, 190000, 203500, 222900, 232050, 276902, 600882, 601199, 601199, 601199, 601471, 601682
282	HCFAT25	1052857	292	2 - 640	890	Pro-19 to Lys-34, Arg-63 to Arg-72, Lys-76 to Pro-113, Gln-133 to Gln-150, Gln-152 to Gln-163, Glu-167 to Arg-187.	AR061: 2, AR089: 2 S0358: 1, H0413: 1, L0502: 1, L0657: 1, H0522: 1 and H0422: 1.		
		932068	568	82 - 588	1166	Lys-15 to Ser-20, Arg-51 to Arg-60, Lys-64 to Pro-101.			
283	HHEQV39	1165420	293	1 - 711	891	Leu-7 to Phe-27, Gln-50 to Gln-57.	AR089: 3, AR061: 1 T0042: 1, H0543: 1 and H0422: 1.		

284	HHFJH79	932851	569	1 - 711	1167	Leu-7 to Phe-27, Gln-50 to Gln-57.	AR061: 2, AR089: 2 H0424: 9, L0747: 7, H0618: 5, H0620: 5, L0809: 5, H0549: 4, H0087: 4, L0655: 4, L0750: 4, S0222: 3, H0253: 3, S0346: 3, H0150: 3, H0081: 3, H0083: 3, H0188: 3, H0428: 3, H0213: 3, L0774: 3, L0805: 3, L0749: 3, L0759: 3, L0005: 2, H0619: 2, S0278: 2, H0635: 2, S0049: 2, H0251: 2, H0546: 2, H0009: 2, H0012: 2, H0024: 2, H0617: 2, H0494: 2, L0769: 2, L0637: 2, L0772: 2, L0803: 2, L0518: 2, L0384: 2, L0665: 2, L0438: 2, H0547: 2, H0658: 2, S0152: 2, H0521: 2, L0439: 2, L0779: 2, L0758: 2, L0592: 2, L0599: 2, L0595: 2, H0543: 2, S0424: 2,		
		1228195	294	608 - 2260	892	Ser-39 to Pro-44, Pro-51 to Thr-56, Gly-78 to Cys-92, Pro-133 to Ser-146, Glu-211 to Ala-219, His-239 to Gln-250, Thr-280 to Glu-285, Asn-347 to Gly-371, Asp-378 to Asn-385, Arg-390 to Gly-398, Thr-406 to Gly-420, Pro-422 to Gly-427, Arg-440 to Leu-450, Pro-458 to Gly-463, Pro-485 to Leu-490, Gly-526 to Pro-533.			

H0352: 2, H0624: 1,  
H0686: 1, H0295: 1,  
S0114: 1, S0134: 1,  
H0341: 1, S0212: 1,  
H0254: 1, S0420: 1,  
S0354: 1, H0351: 1,  
H0550: 1, H0586: 1,  
H0333: 1, H0643: 1,  
L0623: 1, H0486: 1,  
T0039: 1, H0013: 1,  
T0082: 1, H0052: 1,  
H0597: 1, H0545: 1,  
H0178: 1, L0157: 1,  
H0594: 1, H0028: 1,  
H0604: 1, H0032: 1,  
H0674: 1, S0364: 1,  
H0361: 1, H0135: 1,  
H0551: 1, H0264: 1,  
H0100: 1, T0042: 1,  
H0561: 1, L0369: 1,  
L0770: 1, L0639: 1,  
L0800: 1, L0662: 1,  
L0768: 1, L0364: 1,  
L0794: 1, L0804: 1,  
L0375: 1, L0378: 1,  
L0653: 1, L0776: 1,  
L0659: 1, L0365: 1,  
L0542: 1, L0783: 1,  
L0789: 1, L0790: 1,  
L0791: 1, L0666: 1,  
S0052: 1, T0068: 1,



							H0689: 1, H0690: 1, H0684: 1, H0670: 1, H0660: 1, H0648: 1, H0672: 1, S0044: 1, L0741: 1, L0743: 1, L0748: 1, L0751: 1, L0756: 1, L0752: 1, L0731: 1, L0757: 1, H0665: 1, L0096: I and S0194: 1.			
285	HUCOW17	933308	570	2 - 832	1168	Ser-30 to Ser-35.	AR089: 4, AR061: 2 L0439: 5, S0002: 3, L0604: 3, H0619: 2, H0024: 2, H0625: 2, L0768: 2, L0757: 2, H0638: 1, S0420: 1, S0360: 1, H0586: 1, L0163: 1, S0214: 1, L0143: 1, H0264: 1, L0769: 1, L0764: 1, L0774: 1, L0651: 1, L0659: 1, L0542: 1, L0789: 1, H0539: 1, H0521: 1, S0044: 1, L0777: 1, L0758: 1, L0599: 1 and H0422: 1.			
286	HFKIT06	933357	571	155 - 856	1169	Gln-27 to Trp-45.				
		1078092	296	1 - 1119	894	Lys-6 to Trp-11, Pro-26 to Pro-40.	AR089: 0, AR061: 0 H0620: 2, L0761: 2,			

							Pro-48 to Gln-53.	L0766: 2, L0744: 2, L0754: 2, L0596: 2, H0686: 1, H0295: 1, H0657: 1, H0597: 1, H0009: 1, H0264: 1, S0002: 1, L0769: 1, L0774: 1, L0805: 1, L0657: 1, L0790: 1, H0690: 1 and H0521: 1.		
287	HDTBY88	934019	572	1 - 300	1170		Asp-2 to Pro-7, Pro-15 to Gln-20.	AR089: 8, AR061: 2 S0218: 1 and H0486: 1.		
288	HWLHS82	1104159	297	3 - 536	895		His-130 to Lys-140.			
		934472	573	3 - 464	1171		His-130 to Lys-140.			
		1082268	298	3 - 1349	896		Pro-22 to Thr-29, Gly-65 to Lys-75.	AR089: 2, AR061: 1 L0769: 3, S0354: 1, H0393: 1, H0355: 1 and H0124: 1.		
289	HDPNC96	934505	574	2 - 427	1172		Gly-34 to Lys-44, Glu-113 to Glu-118.			
		1081629	299	3 - 734	897		Val-2 to Gly-8, Asp-20 to Gln-26.	AR089: 1, AR061: 1 H0522: 2 and L0766: 1.		
		934520	575	3 - 734	1173		Val-2 to Gly-8, Asp-20 to Gln-26.			
290	HCE5I78	1197899	300	2 - 1126	898		Ala-7 to Gly-15, Pro-33 to Gln-39, Ala-48 to Ala-71, Tyr-83 to Ser-89, Ser-122 to Ile-139,	AR061: 5, AR089: 2 L0439: 8, H0052: 7, L0741: 7, L0756: 4, S0010: 3, H0261: 2, H0156: 2, S0049: 2,		

							Thr-150 to Thr-158, Lys-183 to Phe-193, Pro-277 to Asn-299, Asp-324 to Gly-333, Lys-354 to Glu-361, Gln-367 to Ser-374.	L0770: 2, L0776: 2, L0742: 2, L0745: 2, L0366: 2, S0222: 1, H0438: 1, H0390: 1, S0346: 1, H0009: 1, L0455: 1, S0038: 1, L0789: 1 and L0758: 1.		
291	HISDS62	934531	576	3 - 422	1174		Pro-14 to Gln-20, Ala-29 to Ala-52, Tyr-64 to Ser-70, Ser-103 to His-120.	AR089: 2, AR061: 1 T0049: 1, S0278: 1, H0031: 1 and H0539: 1.		
		1159625	301	182 - 862	899		Ser-39 to Trp-44, Ile-48 to Trp-54, Asn-65 to Asp-87, Pro-94 to Gln-100, Lys-129 to Asp-136, Asp-163 to His-174, Ser-193 to His-199.			
		935932	577	1 - 519	1175		Ser-11 to Trp-16, Ile-20 to Trp-26, Asn-37 to Ser-58, Leu-67 to Gln-72, Lys-101 to Asp-108, Asp-135 to Tyr-140.			
292	HDQDV69	1212566	302	210 - 1697	900		Met-7 to Ser-12, Ser-20 to Arg-30, Asp-85 to Ala-92, Met-119 to Asn-146, Pro-151 to Asp-161, Gln-253 to Glu-260.	AR089: 46, AR061: 33 H0521: 4, H0051: 2, L0803: 2, L0748: 2, L0740: 2, L0756: 2, L0752: 2, L0755: 2, H0590: 1, H0014: 1,		

							Ile-333 to Val-342, Leu-396 to Ala-406.	S0250: 1, L0772: 1, L0764: 1, L0804: 1, H0522: 1, S0406: 1, L0754: 1, L0779: 1, L0731: 1 and L0758: 1.		
		937850	578	2 - 829	1176					
		949702	579	551 - 339	1177		Lys-1 to Thr-7, Arg-34 to Pro-41.			
293	HEMBT61	939957	303	1 - 351	901			AR061: 8, AR089: 4 L0547: 2, S0046: 1, L0471: 1, L0772: 1, L0529: 1 and L0780: 1.		
294	HRODZ70	1088554	304	2 - 661	902		Lys-123 to Lys-128, Trp-180 to Lys-186, Leu-204 to Thr-220.	AR089: 12, AR061: 4 H0598: 1 and H0135: 1.		
		942673	580	3 - 440	1178		Lys-49 to Lys-54, Trp-106 to Lys-112, Leu-130 to Gly-141.			
295	HHERQ79	1184003	305	284 - 703	903		Ser-3 to Thr-11, Lys-32 to Gly-39, Thr-50 to Glu-57, Thr-83 to Gln-88.	AR089: 3, AR061: 2 H0597: 1, H0435: 1 and H0543: 1.		
		944057	581	88 - 474	1179		Ser-3 to Thr-11, Lys-32 to Gly-39, Thr-50 to Glu-57, Thr-83 to Gln-88.			
296	HCECM90	1031741	306	2 - 577	904		Gly-12 to Gly-31, Asn-38 to Gly-62, Asp-70 to Phe-84, Val-94 to Ser-101,	AR061: 2, AR089: 1 H0013: 3, L0439: 2, H0624: 1, H0171: 1, S0040: 1, S0420: 1,		

						Ala-112 to Ser-125, Lys-140 to Asn-145, Asn-175 to Tyr-180, Arg-187 to Thr-192.	H0619: 1, H0156: 1, H0575: 1, H0590: 1, H0052: 1, H0011: 1, H0266: 1, H0494: 1, L0519: 1, H0519: 1, H0555: 1, L0777: 1, L0758: 1, S0436: 1 and H0506: 1.		
	945088	582	2 - 577	1180		Gly-12 to Gly-31, Asn-38 to Gly-62, Asp-70 to Phe-84, Val-94 to Ser-101, Ala-112 to Ser-125, Lys-140 to Asn-145, Asn-175 to Tyr-180, Arg-187 to Thr-192.			
297	HWHGW72	1199614	307	3 - 1208	905	Lys-63 to Pro-72, Val-97 to Gly-102, His-116 to Cys-123, Tyr-161 to Thr-167, Pro-204 to Lys-210, Ala-214 to Lys-222, Glu-276 to Lys-289, Tyr-305 to Thr-312, Pro-383 to Gly-398.	AR054: 23, AR050: 16, AR051: 3, AR089: 1, AR061: 1 H0586: 1 and L0375: 1.		
	945692	583	100 - 939	1181					
	947361	584	327 - 1	1182		Gly-1 to Gly-7, Ala-13 to Gln-21, Ala-43 to Ser-48, Asn-67 to Gly-75,			

298	HPCRV84	1219890	308	123 - 875			Pro-82 to Pro-90. Thr-1 to Leu-12, Asp-107 to Thr-114, Pro-162 to Leu-170.	AR089: 0, AR061: 0		
		945856	585	112 - 417	1183		Thr-1 to Leu-12.			
299	HNSAA28	946988	309	85 - 1557	907		Glu-9 to Ser-20, Ile-23 to Gly-29, Pro-50 to Cys-66, Pro-74 to Glu-79, Glu-93 to Trp-98, Thr-121 to Ser-133, Leu-180 to Lys-196, Thr-213 to Glu-225, Glu-234 to Glu-240, Arg-263 to Glu-270, Glu-283 to Ala-298, Lys-318 to Ala-336, Val-340 to Ala-351, Val-361 to Pro-372, Asn-445 to Pro-468, Pro-475 to Lys-491.	AR050: 8, AR054: 6, AR051: 3, AR089: 1, AR061: 1 H0036: 2, L0766: 2, H0686: 1, H0622: 1, H0625: 1, L0791: 1, L0779: 1 and S0434: 1.		
		972348	586	3 - 452	1184		Thr-1 to Ala-10, Val-20 to Pro-31, Asn-104 to Thr-124.			
300	HLWAR77	947484	310	1287 - 292	908		Gln-97 to Pro-114, Trp-117 to Lys-129, Thr-166 to Gln-173, Ser-178 to Lys-183, Glu-250 to Phe-256, Ser-295 to His-301,	AR050: 21, AR054: 9, AR051: 3, AR089: 1, AR061: 1 H0553: 4 and L0759: 2.		

301	HTTJW49	1127477	311	423 - 1319	909	Tyr-307 to Gln-316, Glu-322 to Ser-330. Phe-8 to Gln-13, Arg-63 to Gly-69, Gly-135 to Lys-144, Ala-201 to Ala-211, Arg-248 to Thr-255, Leu-294 to Pro-299.	AR061: 3, AR089: 2 L0769: 3, L0803: 3, L0748: 3, L0749: 3, H0574: 2, H0046: 2, L0794: 2, L0776: 2, L0439: 2, L0754: 2, L0747: 2, L0755: 2, L0605: 2, L0593: 2, H0686: 1, S0360: 1, L0717: 1, H0069: 1, H0575: 1, H0620: 1, H0024: 1, S0388: 1, H0510: 1, H0266: 1, H0644: 1, H0163: 1, H0090: 1, H0634: 1, H0561: 1, H0695: 1, L0763: 1, L0804: 1, L0774: 1, L0775: 1, L0659: 1, L0783: 1, L0809: 1, L0666: 1, L0665: 1, L0438: 1, H0519: 1, H0658: 1, H0539: 1, S0152: 1, H0522: 1, L0740: 1, L0777: 1, L0603: 1, S0276: 1 and H0542: 1.		
		948107	587	25 - 660	1185	Val-11 to Gly-21, Gly-72 to Thr-80.			

302	HWAFS18	1155193	312	54 - 1718	910	Pro-1 to Pro-7, Leu-10 to Lys-18, Val-119 to Lys-126, Gln-146 to Trp-151.	AR089: 4, AR061: 3 H0581: 3, H0622: 3, H0575: 2, H0090: 2, L0777: 2, L0757: 2, S0114: 1, H0650: 1, H0255: 1, S0360: 1, S0278: 1, H0486: 1, H0318: 1, H0457: 1, H0039: 1, H0553: 1, L0763: 1, L0761: 1, L0764: 1, L0789: 1, H0144: 1, S0374: 1, S0310: 1, H0555: 1, L0758: 1, H0445: 1 and S0276: 1.		
		948434	588	54 - 791	1186	Pro-1 to Pro-7, Leu-10 to Lys-18, Val-119 to Lys-126, Gln-146 to Trp-151, Asp-210 to Arg-216.			
303	HFCBA44	1082762	313	1 - 669	911		AR089: 14, AR061: 9 H0457: 1, H0009: 1, L0666: 1, S0053: 1 and L0741: 1.		
		948533	589	192 - 494	1187				
304	HVADT77	1180374	314	1 - 249	912	Thr-28 to Lys-34, Pro-36 to Asn-44, Lys-72 to Lys-83.	AR089: 4, AR061: 2 L0744: 9, L0747: 8, S014: 7, L0740: 7, S0192: 6, S0027: 5, S0212: 4, H0124: 4,		





060692 in 010701

305	HUFCN91	948886	590	1 - 330	1188	Thr-11 to Trp-25, Ser-35 to Arg-42, Asp-50 to Arg-56, Tyr-75 to Ser-81, Gly-89 to Gln-104.	H0672: 1, S0378: 1, H0555: 1, S0037: 1, S0206: 1, L0777: 1, L0780: 1, S0434: 1, S0011: 1, S0194: 1 and H0506: 1.		
		948886	590	1 - 330	1188	Thr-11 to Trp-25, Ser-35 to Arg-42, Asp-50 to Arg-56, Tyr-75 to Ser-81, Gly-89 to Gln-104.			
305	HUFCN91	1189013	315	25 - 858	913	Cys-7 to Ala-24, Asn-30 to Asn-42, Ser-80 to Ser-89, Leu-130 to Arg-135, Leu-142 to Ser-150, Ser-206 to Leu-217, Arg-234 to Trp-240.	AR089: 2, AR061: 2 H0441: 5, H0134: 3, H0050: 2, S0038: 2, L0777: 2, H0583: 1, H0650: 1, H0656: 1, H0255: 1, H0125: 1, H0192: 1, H0676: 1, H0438: 1, S0049: 1, H0038: 1, H0529: 1, H0690: 1, L0439: 1, H0677: 1 and H0506: 1.		
		949137	591	25 - 924	1189	Cys-7 to Ala-24, Asn-30 to Asn-42, Ser-80 to Ser-89, Leu-130 to Arg-135, Leu-142 to Ser-150, Tyr-161 to Arg-166.			
306	HAGBX32	951351	316	3 - 509	914	Gly-14 to Glu-32, Pro-60 to Ala-70.	AR061: 4, AR089: 4 L0439: 4, L0418: 1,		108730, 147781.

TABLE "S23456"

307	HWMIB81						Thr-145 to Gly-153, Ser-164 to Leu-169.	S0010: 1, L0455: 1, S0028: 1 and L0741: 1.		172471, 186580, 264800, 266600, 278760, 600760, 600760, 600761, 600761, 602066
		956281 1092933	592 317	473 - 138 3 - 572	1190 915		Phe-4 to Gly-12. Ile-94 to Asp-99, Asp-118 to Pro-123, Glu-131 to Ile-140, Tyr-143 to Asp-152, Glu-169 to Lys-179.	AR061: 1, AR089: 1 L0748: 2, H0171: 1, S0134: 1, S0354: 1, S0358: 1, H0014: 1, H0083: 1, H0510: 1, L0764: 1, L0803: 1, L0789: 1, H0593: 1, H0659: 1, H0539: 1, H0555: 1, L0751: 1, L0758: 1, L0759: 1 and L0595: 1.		
308	HCEMU86	955336	593	1491 - 922	1191		Ile-94 to Asp-99, Asp-118 to Pro-123, Glu-131 to Ile-140, Tyr-143 to Asp-152, Glu-169 to Lys-179.			
		1156430	318	1 - 795	916		Ser-3 to Lys-8, His-29 to Lys-38, Pro-201 to Thr-206.	AR061: 3, AR089: 2 L0439: 21, L0438: 12, L0769: 9, T0010: 6,		



[illegible]

							H0252: 2, L0794: 2, L0565: 2, L0744: 2, L0757: 2, S0040: 1, S0212: 1, S0418: 1, S0360: 1, H0549: 1, H0024: 1, L0053: 1, H0124: 1, S0208: 1, S0011: 1 and S0276: 1.		
310	HUVGZ88	1204719	320	503 - 1288	918	Asn-66 to Val-71, Glu-82 to Thr-91. Ser-42 to Arg-50, Gln-66 to Val-73. Pro-14 to His-20, Gln-82 to Asp-92, Ser-161 to Phe-179, Cys-190 to Ser-200, Gln-212 to Ala-217, Glu-235 to Ser-243.	AR089: 2, AR061: 2 L0789: 4, L0758: 4, H0657: 3, H0052: 3, L0438: 3, L0744: 3, L0779: 3, L0005: 2, H0581: 2, H0194: 2, H0046: 2, H0038: 2, L0800: 2, L0659: 2, H0521: 2, L0743: 2, L0439: 2, H0556: 1, S0282: 1, S0358: 1, H0619: 1, H0586: 1, H0618: 1, H0231: 1, S0362: 1, H0622: 1, T0006: 1, H0616: 1, H0413: 1, H0623: 1, L0351: 1, S0150: 1, L0769: 1, L0372: 1,		

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311	HCKS55	959020	597	83 - 439	1195	Asn-89 to Asn-95.	L0662: 1, L0794: 1, L0775: 1, L0651: 1, L0527: 1, L0657: 1, L0666: 1, H0547: 1, H0690: 1, H0658: 1, H0672: 1, H0539: 1, S0378: 1, H0555: 1, L0754: 1, L0747: 1, L0780: 1, L0596: 1, S0192: 1, H0542: 1 and H0423: 1.		
		1197921	321	3 - 1646	919	Asp-1 to Gly-12, Ala-24 to Gln-29, Ala-43 to Asn-61, Ala-68 to Gly-81, Pro-84 to Gln-99, Glu-105 to Gln-110, Ala-118 to Asp-123, Arg-170 to Leu-175, Pro-296 to Thr-306, Asn-311 to Gln-320, Arg-327 to Ala-335, Asp-382 to Gly-389, Ala-441 to Pro-451, Val-464 to Cys-491, Ser-495 to Gly-504, Asp-509 to Trp-516, Gly-518 to Pro-527.	AR089: 13, AR061: 5 H0617: 6, H0556: 4, H0305: 3, S0007: 3, H0618: 3, H0521: 3, L0439: 3, H0672: 2, L0754: 2, L0600: 2, S0442: 1, S0354: 1, S0358: 1, S0045: 1, S0046: 1, S0222: 1, H0438: 1, H0587: 1, H0599: 1, H0036: 1, H0597: 1, H0530: 1, L0118: 1, H0570: 1, H0023: 1, S0250: 1, H0039: 1, H0181: 1, H0674: 1, S0036: 1, L0351: 1, T0041: 1, H0494: 1, H0509: 1,		

									L0769: 1, L0761: 1, L0764: 1, L0768: 1, L0806: 1, H0519: 1, H0593: 1, H0670: 1, H0660: 1, S3014: 1, L0741: 1, L0779: 1 and H0667: 1.		
	961074	598	703 - 1704	1196	Pro-72 to Thr-82, Asn-87 to Gln-96, Arg-103 to Ala-111, Asp-158 to Gly-165.						
312	HOET48	963290	322	2 - 1030	920	Ala-8 to Gly-14, Gly-32 to Arg-48, Ala-58 to Asn-66, Glu-82 to Gln-92, Arg-101 to Gly-110, Thr-124 to Asp-131, Trp-137 to Gly-146, Leu-153 to His-160, Glu-171 to Lys-177, Asp-191 to Ser-196, Glu-225 to Gly-233, Glu-248 to Glu-253, Thr-259 to Trp-265, Arg-268 to Asp-277, Glu-303 to Arg-311, Ala-329 to Leu-343.	AR061: 9, AR089: 5 S0356: 17, S0212: 6, L0747: 6, S0360: 5, H0486: 5, S0418: 3, H0551: 3, S0040: 2, S0354: 2, H0599: 2, H0544: 2, H0617: 2, H0413: 2, S0210: 2, L0794: 2, S0126: 2, S0037: 2, S0027: 2, L0743: 2, H0665: 2, S0192: 2, S0196: 2, S0116: 1, H0662: 1, S0420: 1, H0619: 1, H0550: 1, H0013: 1, H0618: 1, H0253: 1, H0251: 1, H0546: 1, H0545: 1, H0086: 1, H0123: 1, H0024: 1,				

## 062648Z = 012701

313	HBODE51	1193149	323	2704 - 1739	921	Phe-2 to Asp-13, Ser-47 to Gly-52, Arg-161 to Asp-167, Leu-256 to Leu-261, Asp-288 to Asn-296.	H0286: 1, H0252: 1, H0628: 1, S0294: 1, L0372: 1, L0646: 1, L0773: 1, L0806: 1, L0654: 1, L0790: 1, L0565: 1, H0689: 1, H0670: 1, H0660: 1, S0028: 1, S0032: 1, L0751: 1, L0754: 1, L0749: 1, L0777: 1, L0780: 1, L0595: 1, H0668: 1, H0667: 1, S0276: 1, S0424: 1 and H0352: 1.		
							AR089: 4, AR061: 1 L0751: 4, H0052: 3, S0024: 3, S0364: 3, L0438: 3, L0439: 3, H0657: 2, L0415: 2, H0438: 2, H0156: 2, H0373: 2, L0455: 2, H0529: 2, L0664: 2, H0144: 2, L0749: 2, L0592: 2, H0422: 2, L0002: 1, H0583: 1, H0656: 1, S0045: 1, S0046: 1, L0717: 1, H0261: 1, H0455: 1, H0013: 1, H0575: 1, T0082: 1, S0665: 1.		



						S0346: 1, H0581: 1, H0251: 1, H0046: 1, H0009: 1, H0050: 1, H0014: 1, T0010: 1, S0003: 1, S0214: 1, S0366: 1, H0316: 1, H0598: 1, L0351: 1, S0150: 1, L0643: 1, L0764: 1, L0662: 1, L0794: 1, L0805: 1, L0653: 1, L0659: 1, L0666: 1, L0665: 1, H0539: 1, H0521: 1, S0146: 1, H0436: 1, H0478: 1, H0345: 1, L0745: 1, L0758: 1, L0588: 1, L0366: 1, S0026: 1, H0667: 1, S0194: 1, H0542: 1, H0677: 1 and S0446: 1.
964235	599	2 - 2053	1197	Gln-12 to His-20, Val-34 to Tyr-39, Asn-54 to Asn-59, Asp-105 to Gly-110, Gly-247 to Lys-256, Gln-314 to Gly-320, Arg-359 to Ser-366, Arg-420 to Gly-428, Ala-558 to Tyr-563, Leu-574 to Pro-579,		

314	HHFCK09	965304	324	2692 - 389	922	Arg-592 to Phe-597, Ala-621 to Arg-630, Pro-636 to His-641. Tyr-47 to Glu-58, Lys-70 to Gly-77, Pro-121 to Leu-126, Leu-150 to Leu-158, Asn-166 to Glu-171, Arg-417 to Ser-425, Phe-465 to Cys-473, Ser-485 to Asn-492, Ser-497 to Ala-504, Gln-531 to Trp-537, Asp-557 to Glu-562.	AR089: 3, AR061: 2 L0666: 8, L0439: 6, H0253: 5, H0046: 4, L0769: 4, H0295: 3, H0255: 3, L0747: 3, L0756: 3, L0779: 3, H0657: 2, H0618: 2, H0318: 2, H0622: 2, H0068: 2, L0667: 2, L0772: 2, L0776: 2, L0663: 2, H0520: 2, H0593: 2, H0670: 2, H0521: 2, L0750: 2, L0759: 2, L0593: 2, L0601: 2, S0116: 1, H0341: 1, S0212: 1, H0306: 1, H0402: 1, L0617: 1, S0358: 1, H0609: 1, H0592: 1, H0333: 1, T0040: 1, H0013: 1, H0635: 1, H0575: 1, H0036: 1, H0581: 1, H0123: 1, H0050: 1, H0012: 1, H0071: 1, T0010: 1, H0687: 1, H0290: 1, H0617: 1, H0606: 1,		
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[illegible]

315	HCOOZ11	1110364	325	89 - 943	923	Asp-43 to Glu-48.	H0038: 1, H0487: 1, H0494: 1, H0334: 1, S0150: 1, H0647: 1, S0142: 1, L0640: 1, L0639: 1, L0637: 1, L0641: 1, L0768: 1, L0649: 1, L0514: 1, L0659: 1, L0783: 1, L0788: 1, L0664: 1, L0665: 1, L0438: 1, H0547: 1, H0435: 1, H0522: 1, H0696: 1, S0404: 1, H0478: 1, L0742: 1, L0740: 1, L0749: 1, L0758: 1, S0434: 1, S0194: 1, H0422: 1 and H0506: 1.		
							AR089: 15, AR061: 5 H0662: 2, H0670: 1, L0756: 1 and L0759: 1.		
316	HDPPO35	1119032	326	72 - 1202	924	Lys-7 to Gly-69, Lys-82 to Lys-88, Ser-94 to Asp-112, Ala-126 to Asp-131, Tyr-134 to Ser-140, Ser-147 to Phe-156, Asp-159 to Ser-165, Thr-176 to Asp-186, Glu-230 to Leu-250,	AR089: 1, AR061: 0 H0521: 15, H0638: 5, H0580: 5, H0271: 5, H0641: 5, H0560: 4, H0090: 3, H0591: 3, L0766: 3, H0542: 3, H0543: 3, H0586: 2, H0497: 2, H0581: 2, L0655: 2, H0518: 2,		

					Glu-291 to Arg-298, Gln-313 to Glu-320, Asn-331 to Gly-343, Ser-348 to Leu-363.	H0522: 2, L0754: 2, L0747: 2, H0657: 1, H0393: 1, H0431: 1, H0250: 1, H0635: 1, L0021: 1, H0014: 1, H0179: 1, H0416: 1, H0488: 1, L0475: 1, H0359: 1, H0625: 1, S0426: 1, L0598: 1, L0667: 1, L0803: 1, L0804: 1, L0775: 1, L0651: 1, L0659: 1, L0792: 1, L0663: 1, S0428: 1, H0672: 1, H0555: 1, H0436: 1, L0779: 1, H0445: 1 and S0424: 1.	
966248	601	72 - 1202	1199	Lys-7 to Gly-69, Lys-82 to Lys-88, Ser-94 to Asp-112, Ala-126 to Asp-131, Tyr-134 to Ser-140, Ser-147 to Phe-156, Asp-159 to Ser-165, Thr-176 to Asp-186, Glu-230 to Leu-250, Glu-291 to Arg-298, Gln-313 to Glu-320, Asn-331 to Gly-343, Ser-348 to Leu-363.			

317	HLWDZ53	1157542	327	2 - 1126	925		AR089: 5, AR061: 2 L0439: 13, L0752: 4, L0015: 3, H0144: 2, L0438: 2, L0742: 2, L0747: 2, L0758: 2, H0556: 1, L0785: 1, S0001: 1, H0664: 1, H0580: 1, H0486: 1, T0060: 1, H0253: 1, S0010: 1, H0009: 1, H0178: 1, H0564: 1, L0471: 1, S0051: 1, T0010: 1, H0553: 1, H0412: 1, L0370: 1, L0763: 1, L0768: 1, L0794: 1, L0806: 1, L0776: 1, L0657: 1, L0666: 1, H0520: 1, S0126: 1, H0682: 1, H0659: 1, H0187: 1, L0749: 1, L0755: 1 and H0445: 1.		
318	HEOPL36	968602 1197910	602 328	2 - 1126 100 - 501	1200 926	Gly-11 to Thr-16, Ser-35 to Ser-56, Thr-58 to Ser-73, Tyr-85 to Asp-91, Glu-100 to Glu-109.	AR089: 18, AR061: 5 L0740: 11, L0439: 9, L0748: 8, H0616: 5, L0666: 5, L0601: 5, S0444: 4, L0776: 4, L0659: 4, L0744: 4, L0747: 4, L0749: 4,		



## 092648 - 01701

							L0372: 1, L0643: 1, L0764: 1, L0768: 1, L0381: 1, L0775: 1, L0526: 1, L0782: 1, L0663: 1, L0665: 1, H0703: 1, H0520: 1, H0435: 1, H0521: 1, S0044: 1, L0751: 1, L0757: 1, L0759: 1, H0445: 1, L0584: 1, L0608: 1 and H0506: 1.		
319	HMCFS02	1152252	329	3 - 734	927	Gly-11 to Thr-16, Ser-35 to Ser-56, Thr-58 to Ser-73, Tyr-85 to Asp-91, Glu-100 to Glu-109.  Leu-42 to Gln-49, Gln-59 to Thr-65, Pro-119 to Lys-128, Asn-134 to Phe-140, Arg-150 to Phe-155, Asp-205 to Gly-212.	AR061: 2, AR089: 0 L0766: 10, L0794: 7, L0758: 7, L0805: 6, L0751: 4, L0754: 4, L0803: 3, L0483: 2, L0764: 2, L0659: 2, L0809: 2, L0790: 2, L0666: 2, L0755: 2, L0599: 2, H0170: 1, H0294: 1, H0583: 1, H0656: 1, S0282: 1, H0255: 1, S0420: 1, H0618: 1, H0688: 1, L0055: 1, S0344: 1,		

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						H0529: 1, L0761: 1, L0643: 1, L0645: 1, L0804: 1, L0806: 1, L0653: 1, L0776: 1, L0629: 1, L0636: 1, L0788: 1, L0789: 1, L0791: 1, L0665: 1, S0428: 1, H0702: 1, L0438: 1, S0330: 1, H0539: 1, H0478: 1, L0749: 1, L0750: 1, L0779: 1, L0731: 1, L0757: 1, H0665: 1 and H0423: 1.		
320	HDPSR15	969326	604	2 - 496	1202	Arg-3 to Lys-20, Phe-22 to Ser-28, Leu-50 to Gln-57.	AR061: 2, AR089: 2 L0759: 12, L0439: 11, L0766: 7, L0775: 5, H0521: 5, L0755: 5, L0748: 4, L0756: 4, L0777: 4, L0731: 4, L0581: 4, L0619: 3, L0666: 3, L0779: 3, L0757: 3, L0588: 3, S0418: 2, L0618: 2, H0580: 2, L0055: 2, L0769: 2, L0773: 2, L0774: 2, L0791: 2,	





		971315	606	3 - 266	1204	Glu-52 to Leu-58, Arg-63 to Lys-71, Arg-83 to Val-88.	L0809: 1 and H0519: 1.		
322	HFKDR14	1145842	332	3 - 1319	930	Ala-2 to Pro-9, Val-22 to Gly-28.	AR061: 3, AR089: 2 L0792: 2, H0012: 1, H0100: 1, L0663: 1, L0756: 1 and L0780: 1.		
		974255	607	15 - 1733	1205	Ala-5 to Gly-18.			
323	HDPBI30	974711	333	182 - 1312	931	Asp-1 to Asn-10.	AR051: 3, AR050: 1, AR089: 1, AR061: 0 H0521: 3, H0656: 2, H0635: 2, H0549: 1, H0050: 1, H0413: 1, H0641: 1, L0387: 1, H0436: 1 and H0423: 1.		
324	HODFF88	1094875	334	14 - 544	932	His-8 to Gly-18, Glu-150 to Leu-167.	AR054: 34, AR051: 29, AR050: 23, AR089: 4, AR061: 4 H0615: 1		
		974911	608	14 - 544	1206	His-8 to Gly-18, Glu-150 to Leu-167.			

[37] The first column in Table 1A provides the gene number in the application corresponding to the clone identifier. The second column in Table 1A provides a unique "Clone ID NO:Z" for a cDNA clone related to each contig sequence disclosed in Table 1A. This clone ID references the cDNA clone which contains at least the 5' most sequence of the assembled contig and at least a portion of SEQ ID NO:X was determined by directly sequencing the referenced clone. The reference clone may have more sequence than described in the sequence listing or the clone may have less. In the vast majority of cases, however, the clone is believed to encode a full-length polypeptide. In the case where a clone is not full-length, a full-length cDNA can be obtained by methods described elsewhere herein.

[38] The third column in Table 1A provides a unique "Contig ID" identification for each contig sequence. The fourth column provides the "SEQ ID NO:" identifier for each of the contig polynucleotide sequences disclosed in Table 1A. The fifth column, "ORF (From-To)", provides the location (i.e., nucleotide position numbers) within the polynucleotide sequence "SEQ ID NO:X" that delineate the preferred open reading frame (ORF) shown in the sequence listing and referenced in Table 1A, column 6, as SEQ ID NO:Y. Where the nucleotide position number "To" is lower than the nucleotide position number "From", the preferred ORF is the reverse complement of the referenced polynucleotide sequence.

[39] The sixth column in Table 1A provides the corresponding SEQ ID NO:Y for the polypeptide sequence encoded by the preferred ORF delineated in column 5. In one embodiment, the invention provides an amino acid sequence comprising, or alternatively consisting of, a polypeptide encoded by the portion of SEQ ID NO:X delineated by "ORF (From-To)". Also provided are polynucleotides encoding such amino acid sequences and the complementary strand thereto.

[40] Column 7 in Table 1A lists residues comprising epitopes contained in the polypeptides encoded by the preferred ORF (SEQ ID NO:Y), as predicted using the algorithm of Jameson and Wolf, (1988) Comp. Appl. Biosci. 4:181-186. The Jameson-Wolf antigenic analysis was performed using the computer program PROTEAN (Version 3.11 for the Power MacIntosh, DNASTAR, Inc., 1228 South Park Street Madison, WI). In specific embodiments, polypeptides of the invention comprise, or alternatively consist of, at least one, two, three, four, five or more of the predicted epitopes as described in Table 1A.

It will be appreciated that depending on the analytical criteria used to predict antigenic determinants, the exact address of the determinant may vary slightly.

[41] Column 8 in Table 1A provides an expression profile and library code: count for each of the contig sequences (SEQ ID NO:X) disclosed in Table 1A, which can routinely be combined with the information provided in Table 4 and used to determine the tissues, cells, and/or cell line libraries which predominantly express the polynucleotides of the invention. The first number in column 8 (preceding the colon), represents the tissue/cell source identifier code corresponding to the code and description provided in Table 4. For those identifier codes in which the first two letters are not "AR", the second number in column 8 (following the colon) represents the number of times a sequence corresponding to the reference polynucleotide sequence was identified in the tissue/cell source. Those tissue/cell source identifier codes in which the first two letters are "AR" designate information generated using DNA array technology. Utilizing this technology, cDNAs were amplified by PCR and then transferred, in duplicate, onto the array. Gene expression was assayed through hybridization of first strand cDNA probes to the DNA array. cDNA probes were generated from total RNA extracted from a variety of different tissues and cell lines. Probe synthesis was performed in the presence of <sup>33</sup>P dCTP, using oligo(dT) to prime reverse transcription. After hybridization, high stringency washing conditions were employed to remove non-specific hybrids from the array. The remaining signal, emanating from each gene target, was measured using a Phosphorimager. Gene expression was reported as Phosphor Stimulating Luminescence (PSL) which reflects the level of phosphor signal generated from the probe hybridized to each of the gene targets represented on the array. A local background signal subtraction was performed before the total signal generated from each array was used to normalize gene expression between the different hybridizations. The value presented after "[array code]:" represents the mean of the duplicate values, following background subtraction and probe normalization. One of skill in the art could routinely use this information to identify normal and/or diseased tissue(s) which show a predominant expression pattern of the corresponding polynucleotide of the invention or to identify polynucleotides which show predominant and/or specific tissue and/or cell expression.

[42] Column 9 in Table 1A provides a chromosomal map location for certain polynucleotides of the invention. Chromosomal location was determined by finding exact matches to EST and cDNA sequences contained in the NCBI (National Center for Biotechnology Information) UniGene database. Each sequence in the UniGene database is

assigned to a "cluster"; all of the ESTs, cDNAs, and STSs in a cluster are believed to be derived from a single gene. Chromosomal mapping data is often available for one or more sequence(s) in a UniGene cluster; this data (if consistent) is then applied to the cluster as a whole. Thus, it is possible to infer the chromosomal location of a new polynucleotide sequence by determining its identity with a mapped UniGene cluster.

[43] A modified version of the computer program BLASTN (Altshul et al., J. Mol. Biol. 215:403-410 (1990); and Gish and States, Nat. Genet. 3:266-272 (1993)) was used to search the UniGene database for EST or cDNA sequences that contain exact or near-exact matches to a polynucleotide sequence of the invention (the 'Query'). A sequence from the UniGene database (the 'Subject') was said to be an exact match if it contained a segment of 50 nucleotides in length such that 48 of those nucleotides were in the same order as found in the Query sequence. If all of the matches that met this criteria were in the same UniGene cluster, and mapping data was available for this cluster, it is indicated in Table 1A under the heading "Cytologic Band". Where a cluster had been further localized to a distinct cytologic band, that band is disclosed; where no banding information was available, but the gene had been localized to a single chromosome, the chromosome is disclosed.

[44] Once a presumptive chromosomal location was determined for a polynucleotide of the invention, an associated disease locus was identified by comparison with a database of diseases which have been experimentally associated with genetic loci. The database used was the Morbid Map, derived from OMIM™ (*supra*). If the putative chromosomal location of a polynucleotide of the invention (Query sequence) was associated with a disease in the Morbid Map database, an OMIM reference identification number was noted in column 10, Table 1A, labelled "OMIM Disease Reference(s)". Table 5 is a key to the OMIM reference identification numbers (column 1), and provides a description of the associated disease in Column 2.

**TABLE 1B**

Clone ID NO:Z	SEQ ID NO:X	CONTIG ID:	BAC ID: A	SEQ ID NO:B	EXON From-To
HCEPH71	14	522739	AL365319	1207	1-494
HCEPH71	14	522739	AL390715	1208	1-494
HLMD095	43	928344	AC020641	1209	1-591 627-2046
HTEAG49	54	954614	AL390796	1210	1-1310
HTEAG49	54	954614	AL357045	1211	1-1310
HTEAG49	54	954614	AL390796	1212	1-627
HTEAG49	54	954614	AL357045	1213	1-627
HACCH94	103	847143	AL161458	1214	1-1140
HACCH94	103	847143	AL161458	1215	1-90 5811-6312
HFKLX38	113	880220	AL136383	1216	1-32 1288-1454 1561-1646 3840-4700 5482-6798
HTDAB17	117	890384	AC011078	1217	1-297 359-416 3247-3653 6083-6236 9753-10036 11128-11233 12148-12514 12635-13141 15604-16463 19071-19190 19476-20232 20321-20638 21200-21594 21959-22219 23120-23362 23467-24143 24766-24853 25725-26143 26310-26455 27545-30619 30708-31169
HTLCA95	142	911655	AC012616	1218	1-1151
HTLCA95	142	911655	AC012616	1219	1-284
HHEHC53	152	921783	AC009427	1220	1-100 1854-1942 3236-3463 4629-4868

0976485-011701

					5054-5181 5371-5476 5851-5953 6104-6149 6509-6612 7131-8415 8429-8492 8638-8748 8975-9440 9835-10490 10606-10899 11149-11282 11382-11881 12023-12075 12172-12315 12496-12551 12638-12706 12827-12994 13077-13630
HHEHC53	152	921783	AC009427	1221	1-428
HHEHC53	152	921783	AC009427	1222	1-388 466-526 698-906 1023-1922
HELHF07	196	949067	AC073669	1223	1-597
HELHF07	196	949067	AC023605	1224	1-583
HELHF07	196	949067	AC074220	1225	1-362
HELHF07	196	949067	AC074220	1226	1-105
HACAD35	199	949199	AC007363	1227	1-98 3271-3413 4132-4357 7030-7682 11881-12001 12874-13485
HDTKQ14	254	886936	AL359542	1228	1-140 1249-4264
HDTKQ14	254	886936	AL359542	1229	1-499
HDTKQ14	254	886936	AL359542	1230	1-145
HWAGS73	257	894404	AL096870	1231	1-185 393-1743 1951-2118 2229-2295 2410-2906 3043-3107 3238-3519 3594-3970
HWAGS73	257	894404	AL096870	1232	1-1080 2072-2811

HSYBX32	270	909846	AC004084	1233	1-105 839-1021 2069-2302 2470-2855 3818-4265 4371-4610 4761-4810 5364-5802 5930-6517 7073-7807 8063-8618 8636-8875 9438-9537 10568-10774 10897-11025 11718-12323 13749-13849 13978-14188 14474-14554 16489-16624 16924-17019 17239-17458 17908-18185 19014-19266 19356-19451 19620-19873 19893-20920 21092-21247 21512-21579 21621-21754 22001-22831 22992-23518 23710-24370 24426-24596 25213-25493 25661-26192 26588-27433 27598-27742 28073-28199 28359-28651 28777-29249 29379-29502 29646-29794 29833-30033 30085-30630 30702-32661 33104-33374 33383-33661
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					33808-33871 33978-37449 37587-37754 38296-38433 38597-39343 40047-40395 40462-40743 40938-41039 41187-41634 42504-42687 42703-42850 42929-43475
HSYBX32	270	909846	AC004951	1234	1-735 991-1547
HSYBX32	270	909846	AC004084	1235	1-239
HSYBX32	270	909846	AC004084	1236	1-283
HSYBX32	270	909846	AC004951	1237	1-255
HSYBX32	270	909846	AC004951	1238	1-318
HTLJC71	284	922923	AC009516	1239	1-2009
HTLJC71	284	922923	AC007957	1240	1-1747
HTLJC71	284	922923	AC018751	1241	1-2009
HTLJC71	284	922923	AC023490	1242	1-2009
HTLJC71	284	922923	AC009516	1243	1-375
HTLJC71	284	922923	AC009516	1244	1-494
HTLJC71	284	922923	AC007957	1245	1-205
HTLJC71	284	922923	AC018751	1246	1-494
HTLJC71	284	922923	AC023490	1247	1-375
HTLJC71	284	922923	AC018751	1248	1-375
HWMEV63	291	931154	AC078816	1249	1-1574

[45] Table 1B summarizes additional polynucleotides encompassed by the invention (including cDNA clones related to the sequences (Clone ID NO:Z), contig sequences (contig identifier (Contig ID:) contig nucleotide sequence identifiers (SEQ ID NO:X)), and genomic sequences (SEQ ID NO:B). The first column provides a unique clone identifier, "Clone ID NO:Z", for a cDNA clone related to each contig sequence. The second column provides the sequence identifier, "SEQ ID NO:X", for each contig sequence. The third column provides a unique contig identifier, "Contig ID:" for each contig sequence. The fourth column, provides a BAC identifier "BAC ID NO:A" for the BAC clone referenced in the corresponding row of the table. The fifth column provides the nucleotide sequence identifier, "SEQ ID NO:B" for a fragment of the BAC clone identified in column four of the corresponding row of the table. The sixth column, "Exon From-To", provides the location (i.e., nucleotide position numbers) within the polynucleotide sequence of SEQ ID NO:B which delineate certain polynucleotides of the invention that are also exemplary members of polynucleotide sequences that encode polypeptides of the invention (e.g., polypeptides containing amino acid sequences encoded by the polynucleotide sequences delineated in column six, and fragments and variants thereof).

**TABLE 2**

Clone ID NO:Z	Contig ID:	SEQ ID NO:X	Analysis Method	PFam/NR Description	PFam/NR Accession Number	Score/ Percent Identity	NT From	NT To
HTPAD46	503313	335	HMMER 1.8	PFAM: Src homology domain 3	PF00018	4.14	160	186
HCWFF88	506577	336	HMMER 1.8	PFAM: Src homology domain 3	PF00018	4.92	140	181
HSSAX53	507509	337	HMMER 1.8	PFAM: Src homology domain 3	PF00018	4.36	266	331
HCEPH71	522739	14	HMMER 1.8	PFAM: Src homology domain 3	PF00018	4.22	33	62
HTEDF74	522982	338	HMMER 1.8	PFAM: C2 domain	PF00168	6.98	189	233
HTTEK47	573649	339	HMMER 1.8	PFAM: EF hand	PF00036	10.82	224	289
			blastx.2	DJ534K7.2 (novel protein).	sp CAB92087 CAB9 2087	100% 65% 52%	11 283 342	301 378 410
HTOBE75	591896	340	HMMER 2.1.1	PFAM: Sushi domain (SCR repeat)	PF00084	61.2	100	273
HCFAT05	592118	341	HMMER 2.1.1	PFAM: Ion transport protein	PF00520	106.1	137	361
			blastx.2	potassium channel protein [Homo sapiens]	gb AAA59457.1	67% 100% 52%	134 18 360	427 137 491
HFIAH37	615597	342	HMMER	PFAM: C2 domain	PF00168	4.22	241	291

HFTDF15	657020	343	1.8	PFAM: Src homology domain 3	PF00018	4.85	168	203
HPFCU80	685294	344	HMMER 1.8	PFAM: C2 domain	PF00168	4	261	296
HSVAW49	689674	345	HMMER 1.8	PFAM: Src homology domain 3	PF00018	36.33	77	169
			blastx.2	(AF146277) adapter protein CMS [Homo sapiens]	gb AAD34595.1 AF146277_1	97%	65	166
HWHQC94	1116463	23	blastx.14	(AC004472) P1.11659_3 [Homo sapiens]	gi 2984587 gb AAC07985.1	76% 41%	581 476	874 547
HWHQC94	715096	346	HMMER 1.8	PFAM: C2 domain	PF00168	4.17	214	300
			blastx.2	Pig-o.	sp BAA96254 BAA96254	64%	1	627
HRSM49	723025	347	HMMER 1.8	PFAM: Src homology domain 3	PF00018	4.76	199	270
HFTDY67	1151220	25	blastx.14	(AF182316) myoferlin [Homo sapiens]	gi 6731235 gb AAF27176.1 AF182316_1	94% 92% 33% 42% 26%	1368 42 201 63 201	52 1 94 1 145
HFTDY67	745221	348	HMMER 1.8	PFAM: C2 domain	PF00168	20.07	4	144
			blastx.2	Myoferlin.	sp AAF27177 AAF27177	98% 100% 35%	4 224 213	225 298 263
HYABL89	786157	349	HMMER	PFAM: C2 domain	PF00168	6.05	270	317

HCUEV29	1137791	27	1.8 blastx.14	(AL110490) predicted using Genefinder [Caenorhabditis elegans]	gi 5824799 emb CAB 54442.1	53% 53% 64%	96 387 6	344 470 47
HCUEV29	816065	350	HMMER 1.8	PFAM: EF hand	PF00036	31.87	143	229
			blastx.2	CG10641 PROTEIN.	sp Q9VJ26 Q9VJ26	59% 49%	89 312	286 500
HCESP56	827671	351	HMMER 1.8	PFAM: EF hand	PF00036	11.86	240	317
			blastx.2	HYPOTHETICAL 27.4 KDA PROTEIN (FRAGMENT).	sp Q9UJF6 Q9UJF6	100%	186	452
HLQDT35	839777	352	HMMER 1.8	PFAM: Src homology domain 3	PF00018	3.85	342	419
			blastx.2	(AK000579) unnamed protein product [Homo sapiens]	dbj BAA91269.1	98%	252	458
HDPBS64	846624	30	HMMER 1.8	PFAM: Thioredoxins	PF00085	116.87	173	493
			blastx.2	ZK973.11 protein.	sp AAF40013 AAF40 013	32%	182	652
HTBAB41	867287	353	HMMER 1.8	PFAM: C2 domain	PF00168	5.32	89	157
HTLGE31	870247	32	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	21.4	5	115
HWLHK29	1152279	33	blastx.14	(AF181098) synaptotagmin IV [Drosophila melanogaster]	gi 5823558 gb AAD5 3186.1 AF181098_1	27% 29% 30%	474 198 77	602 371 166

HWLHK29	876064	354	HMMER 1.8	PFAM: C2 domain	PF00168	16.97	222	488
HHEGG20	1106816	34	blastx.14	(AF084205) serine/threonine protein kinase TAO1 [Rattus norvegicus]	gi 3452473 gb AAC7 1014.1	84%	3	971
HHEGG20	894409	355	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	200.01	26	598
HDPRU43	1217035	35	blastx.14	PUTATIVE RASGAP- ACTIVATING-LIKE PROTEIN.	sp O43374 O43374	97% 100%	163 52	246 0 174
HDPRU43	909841	356	HMMER 1.8	PFAM: C2 domain	PF00168	82.11	58	303
HE8PK12	909884	357	HMMER 1.8	PFAM: Src homology domain 3	PF00018	58.12	197	361
HE9HV92	1227519	37	blastx.2 blastx.14	(AF136380) SH3P12 protein [Homo sapiens] DIFFERENTIATION ENHANCING FACTOR 1.	gb AAD27647.1 AF1 36380 1 sp O97902 O97902	82% 53% 64% 37% 47% 36%	59 1 820 477 290 766	367 336 105 0 563 340 873
HE9HV92	911510	358	HMMER 1.8 blastx.2	PFAM: Src homology domain 3 DIFFERENTIATION ENHANCING FACTOR 1.	PF00018 sp O97902 O97902	55.67 52% 44% 37% 35%	869 707 8 475 713	104 2 104 8 418 561 871

HOHCE47	911566	359	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	79.42	211	423
HSDII69	917180	360	HMMER 1.8	PFAM: Src homology domain 3	PF00018	4.09	382	429
HKAKM10	1227639	40	blastx.14	NUCLEAR BODY ASSOCIATED KINASE 2B.	sp Q9QUQ8 Q9QUQ 8	88%	9	284 0
HKAKM10	918685	361	HMMER 2.1.1	PFAM: Eukaryotic protein kinase domain	PF00069	31.4	8	127
HCEPU56	920347	362	HMMER 1.8	PFAM: C2 domain	PF00168	3.93	243	293
HUSHB54	928054	42	blastx.2	HYPOTHETICAL 27.3 KDA PROTEIN.	sp O60362 O60362	82%	219	659
HLMDO95	928344	43	HMMER 1.8	PFAM: C2 domain	PF00168	20.52	275	355
			HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	43.25	220	369
			blastx.2	Inflammation-related G protein-coupled receptor EX33.	sp AAF91467 AAF91 467	51% 95%	112 375	375 446
HHASQ32	928730	363	HMMER 2.1.1	PFAM: Carnitine acyltransferase	PF00755	317	250	855
HARAB87	1164340	45	blastx.14	neurotransmitter transporter rB21a [rats, brain, Peptide, 616 aa] [Rattus sp.]	gi 914028 gb AAB32 806.1	89% 83% 90%	51 349 16	350 549 45
HARAB87	933441	364	HMMER 2.1.1	PFAM: Sodium:neurotransmitter	PF00209	79.6	268	570

HTNGF69	933614	365	HMMER 1.8	symporter family PFAM: C2 domain	PF00168	3.94	588	659
HMSJL96	1154788	47	blastx.14	(AF104413) large tumor suppressor 1 [Homo sapiens]	gi 4324434 gb AAD1 6882.1	80% 86% 41%	1 1282 1085	124 5 137 1 117 1
HMSJL96	934483	366	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	26.49	199	363
HDTBT06	935404	367	HMMER 2.1.1	PFAM: Actin	PF00022	110.8	514	903
HTTIE47	1165363	49	blastx.2	actin-related protein - fruit fly (Drosophila melanogaster)	pir S44028 S44028	47%	52	876
HTTIE47	941834	368	HMMER 1.8	PFAM: Sugar (and other) transporters	gi 3881745 emb CAB 05312.1	43% 30% 34%	188 398 559	382 544 627
HHFBP47	946668	50	blastx.2	predicted using Genefinder; Similarity to worm multidrug resistance proteins [Caenorhabditis elegans]	emb CAB01157.1	38%	151	537
HHFBP47	946668	50	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	25.74	696	370
HHFBP47	946668	50	blastx.2	(AL050350) dJ261K5.1 (novel organic cation)	emb CAB56524.1	98% 95%	482 135	955 461



HCCCC81	1083553	51	blastx.14	transporter (BAC ORF RG331P03)) [Homo sapiens] (AL022605) putative protein [Arabidopsis thaliana]	gi 3080435 emb CAA18752.1	100% 77%	38 451	139 516
HCCCC81	949062	369	HMMER 1.8	PFAM: Amino transferases class-III pyridoxal-phosphate	PF00202	178.37	187	816
			blastx.2	hypothetical protein T01B11.2 - Caenorhabditis elegans	pir T25848 T25848	46%	190	879
HPJEV71	949153	370	HMMER 1.8	PFAM: von Willebrand factor type A domain	PF00092	47.98	866	137 5
			blastx.2	CDNA FLJ10601 FIS, CLONE NT2RP2005000.	sp BAA91707 BAA91707	53%	974	153 4
HTEIL07	1136121	53	blastx.14	caltractin [Giardia intestinalis]	gi 1399341 gb AAB05594.1	28% 28%	961 646	112 8 792
			HMMER 1.8	PFAM: EF hand	PF00036	11.27	192	263
HTEAG49	954614	54	blastx.2	Hypothetical 41.3 kDa protein.	sp CAB91065 CAB91065	79%	57	392
			HMMER 1.8	PFAM: Src homology domain 3	PF00018	4.51	312	238
HSLCF96	637670	55	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	10.78	415	576

			blastx.2	(AE000352) putative transport protein [Escherichia coli]	gb AAC75728.1	94% 100% 70% 20% 26%	415 297 1101 409 1021	117 9 413 121 1 600 117 9
HSLCF96	954777	372	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	30.03	1296	101 5
			blastx.2	(AE000352) putative transport protein [Escherichia coli]	gb AAC75728.1	96% 91%	303 1147	112 7 121 5
HNHCl32	861673	56	HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	133.17	195	545
			blastx.2	G protein-coupled receptor 57.	sp AAF27279 AAF27279	100% 100% 100%	189 112 56	551 186 112
HNHCl32	956105	373	HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	133.17	951	601
			blastx.2	(AF112461) G protein-coupled receptor 57 [Homo sapiens]	gb AAF27279.1 AF112461_1	100% 100% 100%	555 478 422	917 552 478
HPMFL08	959569	374	HMMER 1.8	PFAM: Src homology domain 3	PF00018	4.97	209	238
HTXRA13	959622	58	HMMER 2.1.1	PFAM: C2 domain	PF00168	51.3	540	809

				blastx.2	GRANUPHILIN-A.	sp Q9R0Q1 Q9R0Q1	42%	429	109
HCE3H71	1197898	59		blastx.14	SEIZURE-RELATED PROTEIN 6 TYPE 2 PRECURSOR.	sp Q62223 Q62223	89%	413	961
							95%	12	413
							27%	126	266
							34%	150	263
							56%	363	410
							39%	365	448
							41%	216	266
							43%	273	320
							36%	383	448
							46%	410	448
							57%	410	451
HCE3H71	961681	375		HMMER 2.1.1	PFAM: Sushi domain (SCR repeat)	PF00084	79.2	317	496
				blastx.2	seizure-related protein SEZ-6 precursor - mouse	pir I52657 I52657	83%	5	685
							64%	565	957
							30%	98	496
							48%	929	100
									0
HUTSF11	966029	376		HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	27.74	3	104
HTEGI48	1021235	61		blastx.14	(AF074606) histone acetyltransferase [Homo sapiens]	gi 4091980 gb AAC9 9368.1	87%	1	525
HTEGI48	530595	377		HMMER 2.1.1	PFAM: Zinc finger, C2HC type	PF01530	43.8	344	436
HSFAM09	573345	378		HMMER 1.8	PFAM: Src homology domain 3	PF00018	5.33	195	218
HNFHK77	1182286	63		blastx.14	succinic semialdehyde	gi 147901 gb AAC36	100%	180	647

					dehydrogenase [Escherichia coli]	831.1	97%	653	898
HNFHK77	576186	379	HMMER 2.1.1		PFAM: Aldehyde dehydrogenase family	PF00171	30.2	231	326
HFXDO83	1012602	64	blastx.14		No definition line found [Escherichia coli]	gi 912476 gb AAB18 565.1	85%	93	596
HFXDO83	578847	380	HMMER 2.1.1		PFAM: Aldehyde dehydrogenase family	PF00171	46.2	58	207
HSDIW73	1104406	65	blastx.14		(AE000506) putative transport protein, cryptic, orf, joins former yjiZ and yjiL [Escherichia coli]	gi 2367379 gb AAC7 7312.1	100%	1	106 8
HSDIW73	587311	381	HMMER 1.8		PFAM: Sugar (and other) transporters	PF00083	19.71	5	538
			blastx.2		(AE000506) putative transport protein, cryptic, orf, joins former yjiZ and yjiL [Escherichia coli]	gb AAC77312.1	100%	8	107 5
HSDIW73	954821	382	HMMER 1.8		PFAM: Sugar (and other) transporters	PF00083	11.23	1595	108 6
			blastx.2		(AE000506) putative transport protein, cryptic, orf, joins former yjiZ and yjiL [Escherichia coli]	gb AAC77312.1	100%	3	104 9
HFVGD23	676214	383	HMMER 2.1.1		PFAM: Carnitine acyltransferase	PF00755	168.4	2	445
HMSBZ24	1082367	67	blastx.14		contains similarity to C2 domains [Caenorhabditis elegans]	gi 1825586 gb AAB4 2222.1	39% 30% 43% 26%	8 548 551 617	241 646 598 685

HMSBZ24	678707	384	HMMER 1.8 blastx.2	PFAM: C2 domain CG15078 PROTEIN.	PF00168 sp Q9V8M4 Q9V8M4	35.46 50%	8 8	181 289
HWHHB69	690442	385	HMMER 1.8 blastx.2	PFAM: Src homology domain 3 (AF178432) SH3 protein [Homo sapiens]	PF00018 gb AAF35985.1 AF178432.1	31.65 70% 100%	91 91 303	255 315 329
HFXLC69	692773	386	HMMER 1.8	PFAM: C2 domain	PF00168	17.77	84	200
HBXBW40	1156765	70	blastx.14	Protein Kinase [Rattus norvegicus]	gi 2077934 dbj BAA19880.1	93% 78%	214 546	546 587
HBXBW40	706115	387	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	34.01	280	423
HCE1L51	1140498	71	blastx.14	carnitine palmitoyltransferase I [Rattus norvegicus]	gi 294521 gb AAA40876.1	51% 59%	3 288	233 434
HCE1L51	715899	388	HMMER 2.1.1	PFAM: Carnitine acyltransferase	PF00755	102.9	33	434
HRADM45	717358	389	HMMER 1.8 blastx.2	PFAM: Eukaryotic protein kinase domain (AJ271722) putative serine/threonine protein kinase MAK-V [Homo sapiens]	PF00069 emb CAB71146.1	23.7 98%	14 2	124 469
HTEFO45	1153918	73	blastx.14	Munc13-3 [Rattus norvegicus]	gi 1763306 gb AAB39720.1	94%	64	597
HTEFO45	723446	390	HMMER 1.8	PFAM: C2 domain	PF00168	30.64	111	383

HOHBN82	1152271	74	blastx.14	(AF182316) myoferlin [Homo sapiens]	gi 6731235 gb AAF27176.1 AF182316_1	94% 87% 33% 47% 26%	92 1418 1259 1397 1259	140 8 146 5 136 6 145 9 131 5
HOHBN82	724322	391	HMMER 1.8	PFAM: C2 domain	PF00168	49.95	96	347
			blastx.2	Myoferlin.	sp AAF27176 AAF27176	80% 58%	93 571	623 606
HWHGF52	1217026	75	blastx.14	GUANINE NUCLEOTIDE EXCHANGE FACTOR DBS (DBLS BIG SISTER) (MCF2 TRANSFORMING SEQUENCE-LIKE PROTEIN).	sp Q64096 DBS_MO USE	73% 79% 27%	14 338 8	271 439 73
			HMMER 1.8	PFAM: Src homology domain 3	PF00018	5.01	325	387
HWHGF52	726102	392	blastx.2	Dbs=Dbl guanine nucleotide exchange factor homolog [mice, 32D 1	gb AAB33461.1	74% 72% 73%	3 319 203	203 417 259
			blastx.14	BA243J16.3 (similar to MYLK (myosin, light	sp CACI0006 CACI 0006	100% 91%	343 23	672 307

HBKDI30	729048	393	HMMER 1.8	polypeptide 1 PFAM: Eukaryotic protein kinase domain	PF00069	42.23	1	213
HSQFR54	1185143	77	blastx.14	vacuolar protein sorting homolog r-vps33a [Rattus norvegicus]	gi 1477468 gb AAC5 2985.1	86% 94% 96% 92% 31%	52 1134 862 1640 1332	882 164 0 113 7 183 7 146 6
HSQFR54	730964	394	HMMER 2.1.1 blastx.2	PFAM: Sec1 family	PF00995	66.1	2	259
HAGBA56	1102593	78	blastx.14	VACUOLAR PROTEIN SORTING HOMOLOG R-VPS33A.	sp Q63615 Q63615	86%	2	310
HAGBA56	732597	395	HMMER 2.1.1	(AF033655) Pftaire-1 [Mus musculus]	gi 2645810 gb AAB8 7504.1	95% 58% 79%	187 1 132	735 153 203
HHSAE29	1220851	79	blastx.14	PFAM: Eukaryotic protein kinase domain	PF00069	64.9	139	516
HHSAE29	743166	396	HMMER 1.8	probable sugar transport protein - Escherichia coli	pir S47743 S47743	100% 95%	572 1021	946 108 3
HMSHO64	746582	80	HMMER 1.8 blastx.2	PFAM: Sugar (and other) transporters PFAM: Src homology domain 3 (AF030131) Plenty of	PF00083 PF00018 gb AAC40070.1	44.67 11.08 47%	29 316 1	250 405 411

HFPBW22	750631	397	HMMER 1.8	SH3s; POSH [Mus musculus] PFAM: C2 domain	PF00168		19	323	430
HTLBH67	751985	398	HMMER 1.8	PFAM: Src homology domain 3	PF00018		37.78	16	162
HNTMH70	1143523	83	blastx.14	similar to protein kinases [Caenorhabditis elegans]	gi 1072163 gb AAA8 1690.1		50% 40% 29% 47%	425 101 344 62	667 220 445 124
HNTMH70	757184	399	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069		94.55	176	577
HCETC59	761881	400	HMMER 2.1.1	PFAM: Sec I family	PF00995		60.4	117	305
HE8UX76	1161223	85	blastx.14	Vacuolar protein sorting 33B.	sp AAF91174 AAF91 174		78% 100% 64%	123 67 311	368 123 412
				(AB026803) synaptotagmin VI [Mus musculus]	gi 6136784 dbj BAA8 5775.1		98% 91% 97% 36% 34%	437 98 1129 692 1129	108 7 454 138 3 841 124 2
HE8UX76	767871	401	HMMER 1.8	PFAM: C2 domain	PF00168		7.23	592	636
HTLEN77	1136124	86	blastx.14	(AF081671) VU91D calmodulin [synthetic construct]	gi 3800851 gb AAC6 8892.1		43%	240	392



HTLEN77	772363	402	HMMER 1.8	PFAM: EF hand	PF00036	26.93	294	380
			blastx.2	CALTRACTIN (CENTRIN).	sp P53441 CATR_N AEGR	30%	111	374
HBGDI80	1124695	87	blastx.14	(AL078627) actin-like protein; (2 actin domains) [Schizosaccharomyces pombe]	gi 5051483 emb CAB 44762.1	46%	5	328
HBGDI80	781600	403	HMMER 2.1.1	PFAM: Actin	PF00022	33.6	52	318
			blastx.2	CG7940 PROTEIN.	sp Q9VEC3 Q9VEC3	37%	13	336
HELHB88	811935	404	HMMER 1.8	PFAM: EF hand	PF00036	12.8	247	330
			blastx.2	INTERSECTIN LONG ISOFORM.	sp Q9UNK2 Q9UNK 2	84% 46% 100% 30%	139 145 78 361	567 375 146 495
HTEMV66	1152261	89	blastx.14	contains EGF-like repeats; highly similar to ZC84.1; 1	gi 495684 gb AAA50 735.1	56% 44%	265 61	621 195
HTEMV66	813038	405	HMMER 2.1.1	PFAM: Eukaryotic protein kinase domain	PF00069	27.8	154	315
HMTAJ73	813296	406	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	21.34	4	114
HE9TD31	815845	91	HMMER 1.8	PFAM: EF hand	PF00036	17.53	519	605
			blastx.2	Intersectin 2 short isoform.	sp AAF59904 AAF59 904	81% 40%	3 378	626 626
HGBDG55	1141363	92	blastx.14	(AF004161) peroxisomal	gi 2352427 gb AAB6	62%	209	529

HGBDG55	815858	407	HMMER 1.8	Ca-dependent solute carrier [Oryctolagus cuniculus]	9156.1			
			blastx.2	PFAM: EF hand	PF00036	17.24	302	385
HOUHL51	1125914	93	blastx.14	Calcium-binding transporter (Fragment).	sp AAF28888 AAF28 888	61% 64% 37%	209 381 284	388 530 388
				(AJ249457) centrin, putative [Trichomonas vaginalis]	gi 5869981 emb CAB 55607.1	29% 25%	230 173	487 244
HOUHL51	815891	408	HMMER 2.1.1	PFAM: EF hand	PF00036	29.3	429	506
			blastx.2	CENTRIN, PUTATIVE.	sp Q9U519 Q9U519	26%	48	506
HEOPP67	1020119	94	blastx.14	guanylate cyclase activating protein [Mus musculus]	gi 623417 gb AAA60 716.1	31%	169	474
HEOPP67	827630	409	HMMER 2.1.1	PFAM: EF hand	PF00036	35	233	316
			blastx.2	NADPH thyroid oxidase 2.	sp AAF73922 AAF73 922	98%	56	433
HKAOV71	1165423	95	blastx.14	(AF123303) calcium- binding transporter [Homo sapiens]	gi 6841066 gb AAF28 888.1 AF123303_1	88% 93%	61 711	753 755
HKAOV71	827679	410	HMMER 2.1.1	PFAM: EF hand	PF00036	50.7	220	300
			blastx.2	Calcium-binding transporter (Fragment).	sp AAF28888 AAF28 888	88% 93%	61 711	753 755
HDQID90	1137752	96	blastx.14	(AF132480) Ese2 protein	gi 4378889 gb AAD1	75%	11	268

HDQID90	831976	411	HMMER 1.8	[Mus musculus] PFAM: EF hand	9748.1 PF00036	47%	472	522
			blastx.2	Intersectin 2.	sp AAF63600 AAF63600	87% 36%	206 272	694 565
HFRBN81	1182552	97	blastx.14	(AE000192) putative transport [Escherichia coli]	gi 1787127 gb AAC73985.1	99%	2163	598
HFRBN81	833061	412	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	35.69	52	420
			blastx.2	Hypothetical protein Y [Escherichia coli]	dbj BAA35630.1	100%	1	111
HFRBN81	973206	413	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	30.84	52	393
			blastx.2	Hypothetical protein Y [Escherichia coli]	dbj BAA35630.1	80%	4	546
HFRBN81	973208	414	blastx.2	Hypothetical protein Y [Escherichia coli]	dbj BAA35630.1	97% 75% 18%	2 351 56	352 587 229
HFKJW01	1187134	98	blastx.14	lactaldehyde dehydrogenase [Escherichia coli]	gi 145222 gb AAA23427.1	100%	394	8
HFKJW01	836491	415	HMMER 2.1.1	PFAM: Aldehyde dehydrogenase family	PF00171	174	96	440
			blastx.2	lactaldehyde dehydrogenase (EC 1.2.1.22) aldA - Escherichia coli	pir A38165 A38165	100%	96	440
HSDFL63	836498	416	HMMER	PFAM: Aldehyde	PF00171	127.4	1	234

				2.1.1	dehydrogenase family				
				blastx.2	RETINALDEHYDE-SPECIFIC DEHYDROGENASE TYPE 2 (EC 1.2.1.-) (RALDH(II)) (RALDH-2).	sp O94788 DHAS_H_UMAN	100%	1	249
HPJET90	836503	100		HMMER 2.1.1	PFAM: Aldehyde dehydrogenase family	PF00171	150.4	66	371
HEMFC61	836514	101		HMMER 2.1.1	PFAM: Aldehyde dehydrogenase family	PF00171	397.1	10	642
				blastx.2	RETINALDEHYDE-SPECIFIC DEHYDROGENASE TYPE 2 (EC 1.2.1.-) (RALDH(II)) (RALDH-2).	sp O94788 DHAS_H_UMAN	98%	4	642
HDTBR50	1174351	102		blastx.14	intermediate chain 1 [Anthocidaris crassispina]	gi 1817526 dbj BAA09934.1	57% 44%	130 327	306 455
HDTBR50	846630	417		HMMER 1.8	PFAM: Thioredoxins	PF00085	29.85	163	297
				blastx.2	NM23-H8.	sp AAF20909 AAF20909	100% 97%	130 327	327 467
HACCH94	847143	103		HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	167.94	10	735
				blastx.2	ORPHAN G PROTEIN-COUPLED RECEPTOR.	sp O95853 O95853	99%	7	879
HE8TI39	849161	418		HMMER 1.8	PFAM: EF hand	PF00036	12.66	9	86

			blastx.2	CDNA FLJ11040 FIS, CLONE PLACE1004388.	sp BAA91969 BAA9 1969	98%	3	371
HEGAP32	851207	419	HMMER 1.8	PFAM: C2 domain	PF00168	64%	299	685
			blastx.2	SYNAPTOTAGMIN VIII.	sp Q9R0N6 Q9R0N6	63%	627	719
HCWFU66	853005	106	HMMER 2.1.1	PFAM: Aldehyde dehydrogenase family	PF00171	33.03	11	172
HUSYI29	853149	107	HMMER 2.1.1	PFAM: Sec1 family	PF00995	85%	50	238
			blastx.2	VACUOLAR PROTEIN SORTING HOMOLOG R-VPS33A.	sp Q63615 Q63615	90%	270	299
HMEFT66	1134131	108	blastx.14	(AF121859) sorting nexin 9 [Homo sapiens]	gi 4689258 gb AAD2 7832.1 AF121859_1	70%	241	270
HMEFT66	856149	420	HMMER 1.8	PFAM: Src homology domain 3	PF00018	71.4	105	269
HKAAR71	863023	109	HMMER 1.8	PFAM: C2 domain	PF00168	108.8	3	332
			blastx.2	TOLLIP PROTEIN.	sp Q9UJ69 Q9UJ69	95%	3	314
H7TBC95	865922	110	HMMER 2.1.1	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	93%	403	591
			blastx.2	G-protein coupled	sp BAA93001 BAA9	90%	335	394
						31%	87	221
						46%	754	909
						40%	193	324
						57%	142	183
						41%	688	738
						28.51	5	136
						16.26	309	551
						78%	147	959
						189.5	3	695
						56%	516	701

H7TBC95	908115	421	HMMER 2.1.1	receptor SALPR.	3001	61%	51	206
				PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	41%	303	440
			blastx.2	angiotensin II receptor [Xenopus laevis]	gb AAC59635.1	189.5	3	695
HAPPX52	872075	422	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	37.84	72	359
HBGSI13	1152326	112	blastx.14	ferrienterobactin receptor precursor [Escherichia coli]	gi 1778500 gb AAB4 0783.1	94%	1	753
HBGSI13	878322	424	HMMER 1.8	PFAM: Src homology domain 3	PF00018	4.07	445	510
			blastx.2	ferrienterobactin receptor precursor [Escherichia coli]	gb AAB40783.1	92%	64	684
HFKLX38	880220	113	HMMER 2.1.1	PFAM: PMP- 22/EMP/MP20/Claudin family	PF00822	103.9	9	299
			blastx.2	(AF087825) claudin-7 [Mus musculus]	gb AAD09760.1	44%	3	299
HTLGP15	1165362	114	blastx.14	(AF060173) SV2 related protein [Rattus norvegicus]	gi 3901268 gb AAC7 8627.1	88%	301	786
HTLGP15	880297	425	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	34.17	291	590
HMEGH46	887791	426	HMMER 1.8	PFAM: C2 domain	PF00168	12.81	10	78

HE8PY29	1129488	116	blastx.2	GLUT4 VESICLE PROTEIN (FRAGMENT).	sp Q9Z1X5 Q9Z1X5	60% 50%	7 40	216 216
HE8PY29	887862	427	HMMER 1.8	(AF100751) FK506-binding protein FKB23 isoform [Homo sapiens]	gi 5410288 gb AAD43015.1	100%	2	277
HTDAB17	890384	117	HMMER 2.1.1	PFAM: EF hand	PF00036	13.65	191	250
HCFCF47	894415	428	HMMER 1.8	FK506-BINDING PROTEIN.	sp Q9Y6B0 Q9Y6B0	100%	2	277
HDQHB19	895106	429	HMMER 2.1.1	PFAM: Thioredoxin	PF00085	107.9	276	533
HAGDN53	1129154	120	blastx.2	CG1837 PROTEIN.	sp Q9VYV3 Q9VYV3	42% 43% 41%	225 231 348	518 539 533
HAGDN53	895963	430	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	89.54	20	295
HUFDB74	1162672	121	blastx.14	PFAM: Eukaryotic protein kinase domain	PF00069	92.5	260	520
HUFDB74	1162672	121	blastx.14	PALS1.	sp AAF63789 AAF63789	97%	3	293
HUFDB74	1162672	121	blastx.14	PFAM: Src homology domain 3	PF00018	22.95	270	335
HUFDB74	1162672	121	blastx.14	coded for by C. elegans cDNA yk34a9.5; coded for by C. elegans 1 elegans]	gb AAA96115.1	43% 38%	165 103	455 156
HUFDB74	1162672	121	blastx.14	phosphoinositide-specific phospholipase C [catfish,	gi 1195552 gb AAA87954.1	58% 69%	170 2	547 160

HUFDB74	901451	431	HMMER 2.1.1	olfactory rosettes, Peptide Partial, 502 aa]	PF00387	89.4	2	127
HNHFH24	1092567	122	blastx.2	PFAM: Phosphatidylinositol- specific phospholipase C, Y domain	sp AAF69605 AAF69 605	58% 68%	908 763	756 632
HNHFH24	903741	432	HMMER 2.1.1	PFAM: Sodium:neurotransmitter symporter family	PF00209	37.2	208	306
HBGQT03	908173	433	blastx.14 HMMER 2.1.1	(AF075266) orphan transporter isoform B9 [Mus musculus]	gi 3347930 gb AAC2 7761.1	76% 27%	187 414	327 467
HETLF29	1103959	124	blastx.14	PFAM: SH3 domain	PF00018	68.5	615	785
HETLF29	909762	434	HMMER 1.8	(AF130979) SH3 domain- containing protein 6511 [Homo sapiens]	gb AAF04472.1 AF1 30979_1	93%	3	791
HETLF29	909762	434	blastx.14	(AJ250839) serine/threonine protein kinase [Homo l	gi 7160989 emb CAB 76471.1	97%	3	482
HOUGD29	909797	435	blastx.14 HMMER 2.1.1	PFAM: Eukaryotic protein kinase domain	PF00069	143.18	6	416
HOUGD29	909797	435	blastx.14	similar to cAMP- dependant protein kinase; cDNA EST 111	gi 3878636 emb CAA 88953.1	56%	6	416
HOUGD29	909797	435	HMMER 2.1.1	PFAM: Phosphatidylinositol- specific phospholipase C,	PF00387	118.2	202	453



				blastx.14	Y domain							
				blastx.14	(AF044576) phospholipase C PLC210 [Caenorhabditis elegans]							
HTEMV09	1128254	126		blastx.14	protein kinase I [Rattus norvegicus]				gi 2957270 gb AAC3 8963.1	42%	202	753
HTEMV09	909843	436		HMMER 1.8	PFAM: Eukaryotic protein kinase domain				gi 406113 gb AAA19 670.1	44%	1	321
				blastx.14	protein kinase I [Rattus norvegicus]				PF00069	99.16	19	312
HNTNB14	1128964	127		blastx.14	calmodulin-binding protein [Rattus norvegicus]				gi 406113 gb AAA19 670.1	44%	1	321
				blastx.14	calmodulin-binding protein [Rattus norvegicus]				gi 349075 gb AAA16 633.1	98%	42	476
HNTNB14	909942	437		HMMER 1.8	PFAM: Eukaryotic protein kinase domain				PF00069	47%	626	676
				blastx.14	calmodulin-binding protein [Rattus norvegicus]					33%	587	676
				HMMER 1.8	PFAM: Eukaryotic protein kinase domain					96.28	38	343
				blastx.14	calmodulin-binding protein [Rattus norvegicus]				gi 349075 gb AAA16 633.1	97%	41	475
										85%	553	657
										74%	553	657
										77%	553	657
										69%	559	657
										65%	553	657
										60%	553	657
										52%	553	654
										37%	553	657
										39%	553	636
										35%	553	645
										33%	559	657
										77%	512	538
HE2KZ07	1149808	128		blastx.14	(AB004267)				gi 3135197 dbj BAA2	29%	556	657
										92%	17	508

HE2KZ07	909948	438	HMMER 1.8	Ca2+/calmodulin- dependent protein kinase I beta 2 [Rattus norvegicus]	8263.1			
			blastx.14	PFAM: Eukaryotic protein kinase domain (AB004267)	PF00069	115.19	5	289
				Ca2+/calmodulin- dependent protein kinase I beta 2 [Rattus norvegicus]	gi 3135197 dbj BAA2 8263.1	96% 56%	17 418	433 507
HSIGN57	1105444	129	blastx.14	(AB033615) phospholipase C-L2 [Mus musculus]	gi 6705987 dbj BAA8 9457.1	96% 70%	3 982	962 104 1
HSIGN57	910078	439	HMMER 2.1.1	PFAM: Phosphatidylinositol- specific phospholipase C, Y domain	PF00387	159.3	131	484
			blastx.2	PHOSPHOLIPASE C-L2.	sp Q9QYG1 Q9QYG 1	83%	2	754
HLHBC30	1106654	130	blastx.14	1-phosphatidylinositol- 4,5-bisphosphate phosphodiesterase 1	pir S14113 S14113	85% 77% 85%	9 408 155	332 512 175
HLHBC30	910079	440	HMMER 1.8	PFAM: C2 domain	PF00168	104.78	45	305
			blastx.2	1-phosphatidylinositol- 4,5-bisphosphate phosphodiesterase 1	pir S14113 S14113	83% 74%	9 408	332 512
HFBDJ13	1195217	131	blastx.14	SH3 domains-containing protein POSH - mouse	pir T09071 T09071	90% 56% 26% 39%	178 1171 598 272	118 2 136 5

								57%	898	699
								41%	514	370
								28%	823	939
								30%	315	600
										897
										383
HFBDJ13	911264	441	HMMER 2.1.1	PFAM: SH3 domain	PF00018			78.6	105	269
			blastx.2	(AF030131) Plenty of SH3s; POSH [Mus musculus]	gb AAC40070.1			78%	3	473
HTPGG25	911282	442	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069			114.02	72	353
			blastx.2	(AL117482) hypothetical protein [Homo sapiens]	emb CAB55955.1			94%	9	353
								92%	350	622
								63%	2	58
HSSMT34	911294	133	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069			53.16	95	292
HWWDN3 4	1152430	134	blastx.14	(AF144094) unconventional myosin-15 [Homo sapiens]	gi 6224683 gb AAF05 903.1			45%	350	814
								51%	128	349
								66%	800	880
								37%	72	152
								56%	87	134
								80%	96	125
								28%	28	207
								37%	69	140
								57%	178	219
								29%	216	287
								46%	354	398
								33%	339	401

[illegible]

			blastx.2	unnamed protein product [unidentified]	emb CAB42388.1	73%	111	410
HDPSR74	911396	138	HMMER 1.8	PFAM: Src homology domain 3	PF00018	100%	3	116
			blastx.2	(AF104246) enhancer of filamentation 1 homolog [Gallus gallus]	gb AAD11795.1	47.19	293	460
						48%	281	553
HHEZT58	911416	446	HMMER 1.8	PFAM: Src homology domain 3	PF00018	80.7	277	444
			blastx.14	myosin I heavy chain [Dictyostelium discoideum]	gi 167839 gb AAA33 229.1	47%	277	435
HTLDU05	911649	140	HMMER 1.8	PFAM: Actins	PF00022	141.45	125	469
			blastx.2	ACTIN-LIKE-7-BETA.	sp Q9Y614 Q9Y614	72%	2	580
HTLET56	1189721	141	blastx.14	actin [Filobasidiella neoformans]	gi 508701 gb AAC49 074.1	52%	192	854
						48%	932	129
						30%	837	1
HTLET56	911654	447	HMMER 1.8	PFAM: Actins	PF00022	262.03	134	986
			blastx.2	actin 1 - Trypanosoma brucei	pir A27724 A27724	53%	134	715
						39%	718	963
						40%	942	102
								2
HTLCA95	911655	142	HMMER 2.1.1	PFAM: Actin	PF00022	345.2	170	109
			blastx.2	actin - Phaffia rhodozyma	pir S70377 S70377	40%	2	6
								109
								6

HTEJT86	1090517	143	blastx.14	actin [Diphyllbothrium dendriticum]	gi 1098579 gb AAA82604.1	50% 52% 55%	142 670 22	684 111 9 129
HTEJT86	911656	448	HMMER 2.1.1	PFAM: Actin	PF00022	106.8	4	366
			blastx.2	ACTIN.	sp Q9UVF3 Q9UVF3	44% 66%	25 366	369 410
HTEMA54	1134919	144	blastx.14	(AF113526) actin-like-7-alpha [Homo sapiens]	gi 5524058 gb AAD44109.1 AF113526.1	94%	55	135 9
HTEMA54	911666	449	HMMER 2.1.1	PFAM: Actin	PF00022	320.7	247	116 1
			blastx.2	ACTIN-LIKE-7-ALPHA.	sp Q9Y615 Q9Y615	92% 82%	55 1121	116 7 136 0
HTLGJ17	1135518	145	blastx.14	(AF191277) cytoplasmic actin [Cavia porcellus]	gi 6478616 gb AAF13923.1 AF191277.1	59% 44%	360 521	440 574
HTLGJ17	915136	450	HMMER 1.8	PFAM: Actins	PF00022	25.12	237	317
			blastx.2	DJ63M2.2 (similar to ACTIN) (Fragment).	sp CAC08484 CAC08484	81% 76%	93 403	413 465
HOUES64	918119	146	HMMER 2.1.1	PFAM: Aldehyde dehydrogenase family	PF00171	138.5	3	278
			blastx.2	lactaldehyde dehydrogenase (EC 1.2.1.22) aldA - Escherichia coli	pir A38165 A38165	98%	3	275
HMSCD15	982250	147	blastx.14	FBP 17 [Mus musculus]	gi 1255033 gb AAC5	93%	453	635

[illegible]

HAHGD33			1.8	kinase domain (AF145690) BcDNA.LD28657 [Drosophila melanogaster]	gi 5052670 gb AAD3 8665.1 AF145690_1	68% 56% 60% 39%	1 412 304 676	297 609 426 804
HHEHC53	921783	152	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF000069	58.81	507	797
			blastx.14	(AF145690) BcDNA.LD28657 [Drosophila melanogaster]				
HE2PB01	921850	456	HMMER 2.1.1	PFAM: Actin	PF00022	35.9	29	616
			blastx.2	HSPC281 (Fragment).				
HOUDP52	1219522	154	blastx.14	CG7846 PROTEIN.	sp Q9VX09 Q9VX09	43% 52% 35% 35%	27 1218 501 1002	491 136 1 752 120 2
HOUDP52	922102	457	HMMER 2.1.1	PFAM: Actin	PF00022	32	760	109 5
			blastx.2	CG7846 PROTEIN.				
HHGAE47	1127881	155	blastx.14	(AF187305) calmodulin [Myxine glutinosa]	gi 5932428 gb AAD5 6955.1 AF187305_1	45%	59	499
			HMMER 1.8	PFAM: EF hand				
HHGAE47	922194	458			PF00036	16.77	171	257



HMCGL45	1165349	156	blastx.2	calmodulin [validated] - human	pir S48728 MCHU	48%	310	576
			blastx.14	(AF187305) calmodulin [Myxine glutinosa]	gi 5932428 gb AAD56955.1 AF187305.1	48%	138	260
HMCGL45	922195	459	HMMER 2.1.1	PFAM: EF hand	PF00036	26.6	460	546
			blastx.2	CALMODULIN.	sp Q9U6D3 Q9U6D3	45%	460	867
HELEF11	1153884	157	blastx.14	gamma-glutamyl phosphate reductase [Escherichia coli]	gi 1552811 gb AAB08663.1	100%	1283	531
HELEF11	926930	460	HMMER 2.1.1	PFAM: Pyridoxal-dependent decarboxylase conserved domain	PF00282	202.9	146	565
			blastx.2	glutamate decarboxylase (EC 4.1.1.15) beta - Escherichia coli	pir B43332 B43332	81% 100% 56% 47%	131 45 595 564	721 152 780 620
HETJX04	1212235	158	blastx.14	GRANUPHILIN-A.	sp Q9R0Q1 Q9R0Q1	94% 64% 87%	6 685 804	683 810 827
HETJX04	927120	461	HMMER 2.1.1	PFAM: C2 domain	PF00168	150.4	9	260
			blastx.2	GRANUPHILIN-A.	sp Q9R0Q1 Q9R0Q1	94% 57% 48%	6 685 719	683 831 859
HSOBC04	927280	462	HMMER 2.1.1	PFAM: EF hand	PF00036	23.5	278	346
			blastx.2	hypothetical protein DKFZp586I0821.1 -	pir T42709 T42709	88%	41	388

HE8PW83	1069980	160	blastx.14	human (fragment) (AB002584) beta-alanine- pyruvate aminotransferase 1	gi 1944136 dbj BAA1 9549.1	86%	4	546
HE8PW83	927532	463	HMMER 1.8	PFAM: Aminotransferases class- III pyridoxal-phosphate	PF00202	139.27	4	465
			blastx.2	ALANINE-- GLYOXYLATE AMINOTRANSFERASE 2 PRECURSOR (EC 1.1	sp Q64565 AGT2_R AT	83%	4	546
HWLEA48	927676	161	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	32.82	190	381
			blastx.2	(AF169034) protein kinase [Homo sapiens]	gb AAF12757.2 AF1 69034_1	59% 100% 51%	154 89 287	429 166 415
HNHNP81	1129143	162	blastx.14	(AF091575) olfactory receptor [Rattus norvegicus]	gi 3769641 gb AAC6 4595.1	62% 61% 72%	618 236 502	896 505 621
HNHNP81	928378	464	HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	58.09	233	511
			blastx.2	OLFACTORY RECEPTOR (FRAGMENT).	sp Q9Z231 Q9Z231	61% 52%	236 502	505 618
HFIDL68	1123641	163	blastx.14	G protein-coupled receptor [Lymnaea stagnalis]	gi 438129 emb CAA8 0651.1	44% 46%	945 1086	742 997
HFIDL68	928475	465	HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin)	PF00001	50.42	8	319

				family)					
HUJCT05	1165261	164	blastx.2	CG5042 PROTEIN.	sp Q9VBP0 Q9VBP0	38%	8	397	
			blastx.14	(AF155116) NY-REN-60 antigen [Homo sapiens]	gi 5360127 gb AAD42882.1 AF155116.1	100%	1277	154	
HUJCT05	929264	466	HMMER 1.8	PFAM: EF hand	PF00036	11.52	359	433	
			blastx.2	CG8334 PROTEIN (FRAGMENT).	sp Q9VW49 Q9VW49	59%	56	499	
HTEGO05	932583	165	HMMER 2.1.1	PFAM: Eukaryotic protein kinase domain	PF00069	50.8	3	233	
			blastx.14	male germ cell-associated kinase (mak) [Rattus norvegicus]	gi 205278 gb AAA41562.1	85% 64% 85% 38%	3 489 768 1023	395 761 848 110 0	
HRDBH58	1226719	166	blastx.14	probable aldehyde dehydrogenase PA4073 [imported] - Pseudomonas aeruginosa (strain PAO1)*	pir H83136 H83136	38% 40% 56% 31% 27% 23% 40% 30% 50% 25%	1320 2124 675 462 2328 894 1101 354 831 1125	163 7 230 9 770 635 247 1 109 4 119 6 461 872 118	



HHFEQ42	934527	470	HMMER 2.1.1 blastx.14	PFAM: C2 domain (AB025258) granuphilin-a [Mus musculus]	PF00168	42% 31% 46%	630 186 567	743 299 605
HLQDC55	1082368	171	blastx.14	(AK002037) unnamed protein product [Homo sapiens]	gi 5926736 dbj BAA8 4656.1	40% 57% 46% 39% 31% 46% 38% 75%	128 887 695 707 263 644 572 107	505 105 7 892 820 376 682 610 130
HLQDC55	934528	471	HMMER 2.1.1 blastx.2	PFAM: C2 domain CG15078 PROTEIN.	PF00168 sp Q9V8M4 Q9V8M 4	81.1 34% 43% 64%	1 7 1 444	216 441 234 494
HFPPI62	1195825	172	blastx.14	rabphilin-3A - bovine	pir A48097 A48097	95% 68%	184 4	111 9 90
HFPPI62	934529	472	HMMER 1.8 blastx.2	PFAM: C2 domain rabphilin-3A - mouse	PF00168 pir JX0338 JX0338	106.44 90%	27 3	293 410
HE8QH09	1152238	173	blastx.14	(AB000893) synaptotagmin 3 [Mus]	gi 1840399 dbj BAA1 9204.1	95% 96%	28 585	591 923

HE8QH09	934532	473	HMMER 2.1.1	musculus]	PF00168	39%	46	228
			blastx.14	(AB000893) synaptotagmin 3 [Mus musculus]	gi 1840399 dbj BAA1 9204.1	92%	56	568
						98%	564	830
						42%	407	556
						33%	573	731
						32%	170	328
						34%	56	205
						100%	21	53
						39%	430	498
HFAAX29	1128791	174	blastx.14	(AF000423) synaptotagmin XI [Rattus norvegicus]	gi 2130632 gb AAB5 8344.1	99%	25	570
						35%	385	510
						25%	169	333
						47%	331	387
HFAAX29	934540	474	HMMER 2.1.1	PFAM: C2 domain	PF00168	115.2	194	463
			blastx.2	SYNAPTOTAGMIN XI.	sp O08835 O08835	98%	8	550
						32%	149	490
HHFOC79	1182276	175	blastx.14	(AF081251) putative eps protein [Rattus norvegicus]	gi 3415099 gb AAC3 1599.1	97%	84	296
HHFOC79	935406	475	HMMER 1.8	PFAM: EF hand	PF00036	13.96	186	263
			blastx.2	EH domain containing 2.	sp AAF40470 AAF40 470	98%	54	248
HOGEQ43	935465	476	HMMER 1.8	PFAM: Src homology domain 3	PF00018	28.13	58	132

HCECQ23	938398	177	blastx.2	(AF132480) Ese2 protein [Mus musculus]	gb AAD19748.1	93%	37	132
			HMMER 2.1.1	PFAM: CUB domain	PF00431	53.7	567	433
			blastx.2	seizure-related protein SEZ-6 precursor - mouse	pir 52657 52657	93% 90% 29% 35% 30% 27% 27%	810 335 765 744 747 687 537	370 237 370 571 574 484 409
HTGAU79	1178621	178	blastx.14	(AL157917) similarity to endopeptidases 1	gi 7106102 emb CAB 76028.1	50% 38% 52% 52%	745 361 607 313	966 561 720 363
HTGAU79	940369	477	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	31.25	315	779
			blastx.2	(AL157917) similarity to endopeptidases [Schizosaccharomyces 1	emb CAB76028.1	45%	324	977
HE9FI33	1156432	179	blastx.14	putative integral membrane transport protein [Rattus norvegicus]	gi 3004482 emb CAA 71076.1	59% 61%	14 1153	286 120 6
HE9FI33	941348	478	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	17.62	210	422
			blastx.2	putative integral membrane transport protein [Rattus norvegicus]	emb CAA71076.1	53%	3	428

HNHCP79	941862	480	HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	118.47	2	670
			blastx.14	(AF102533) olfactory receptor F7 [Mus musculus]	gi 3983394 gb AAD1 3325.1	55%	2	658
HTLIY52	1194806	181	blastx.14	TESTIS-SPECIFIC SERINE/THREONINE KINASE.	sp Q61241 Q61241	46% 48% 45% 42%	624 126 411 549	956 398 563 605
HTLIY52	942161	481	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	251.19	166	933
			blastx.2	serine/threonine kinase [Mus musculus]	gb AAA99535.1	44%	133	936
HRAED74	942527	182	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	59.6	406	612
			blastx.2	(AB023658) Ca/calmodulin-dependent protein kinase kinase alpha, CaM-kinase kinase alpha [Rattus norvegicus]	dbj BAA75246.1	97% 81% 71% 88%	71 388 342 662	346 648 425 688
HFKKN77	943757	183	HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	80.79	274	573
			blastx.2	G-protein coupled receptor, SREB3 - human	pir JC7289 JC7289	82%	160	714
HTEMU66	1205381	184	blastx.14	MEK KINASE ALPHA.	sp O96611 O96611	51% 66%	714 633	962 668
HTEMU66	944419	482	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	114.85	613	963



				blastx.2	MEK Kinase 3 [Mus musculus]	gb AAB03355.1	49%	604	948
HWAGU62	1206797	185		blastx.14	Zinc transporter like 1.	sp AAF43422 AAF43422	29%	209	340
							95%	264	827
							96%	969	151
							93%	29	1
							33%	22	262
									111
HWAGU62	945368	483		HMMER 2.1.1	PFAM: Cation efflux family	PF01545	152	619	139
				blastx.2	(AC007231) putative cation transport protein [Arabidopsis thaliana]	gb AAD32753.1 AC007231_1	45%	388	5
							42%	910	858
							38%	883	138
									6
									951
HFPFB39	1198036	186		blastx.14	CG8745 PROTEIN.	sp Q9VU95 Q9VU95	65%	153	614
							60%	693	935
							65%	945	111
							66%	1332	8
							35%	1161	141
							50%	609	2
									132
									8
									686
HFPFB39	946170	484		HMMER 1.8	PFAM: Aminotransferases class-III pyridoxal-phosphate	PF00202	235.05	1613	714
				blastx.2	hypothetical protein T01B11.2 - Caenorhabditis elegans	pir T25848 T25848	49%	1613	651
HPMFI38	1165993	187		blastx.14	(AB005451) RST [Mus musculus]	gi 2696709 dbj BAA23875.1	51%	30	296
							73%	382	438

HPMFI38	946252	485	HMMER 1.8 blastx.2	PFAM: Sugar (and other) transporters renal organic anion transporter [Pseudopleuronectes americanus]	PF000083 emb CAB09724.1	32.16	860	564
HBXD107	946830	188	HMMER 2.1.1 blastx.2	PFAM: Synaptophysin / synaptoporin synaptoporin - rat	PF01284 pir JH0300 JH0300	406.7	125	604
HOFMS43	1152417	189	blastx.14	porcine membrane cofactor protein [Sus scrofa]	gi 1018989 dbj BAA2 0476.1	62% 47% 52% 29% 36% 33%	325 7 322 673 688 512	738 312 378 765 744 574
HOFMS43	947973	486	HMMER 2.1.1 blastx.2	PFAM: Sushi domain (SCR repeat)	PF00084	64	174	302
HOVCO14	1091087	190	blastx.2	POPCINE MEMBRANE COFACTOR PROTEIN. C4BP beta chain, leader [Rattus norvegicus]	sp O02839 O02839 emb CAA90392.1	47% 34%	12 3	317 434
HOVCO14	947999	487	HMMER 2.1.1 blastx.2	PFAM: Sushi domain (SCR repeat) UNKNOWN PROTEIN (FRAGMENT).	PF00084 sp Q28797 Q28797	84	21	170
HTEPE35	1105272	191	blastx.14	l-phosphatidylinositol- 4,5-bisphosphate	pir S14113 S14113	33% 34% 38% 47% 53% 51%	21 21 424 424 1 451	347 380 516 474 357 750

HTEPE35	948475	488		phosphodiesterase I PFAM: Phosphatidylinositol- specific phospholipase C, Y domain	PF00387	163.8	839	507
			blastx.2	1-phosphatidylinositol- 4,5-bisphosphate phosphodiesterase I	pir S14113 S14113	48%	839	90
HE8UA52	1229490	192	blastx.14	collagen alpha 3(VI) chain precursor - chicken	pir A37797 A37797	34% 32% 35% 19% 44% 24% 50% 26% 30%	121 805 700 208 814 196 808 208 395	729 135 3 819 330 867 306 861 330 484
HE8UA52	948509	489	HMMER 1.8	PFAM: von Willebrand factor type A domain	PF00092	57.11	208	561
			blastx.2	collagen alpha 3(VI) chain - mouse (fragment)	pir S32605 S32605	41%	121	576
HOUBE50	1090776	193	blastx.14	neurologin 3 [Rattus norvegicus]	gil 1145791 gb AAA9 7871.1	74% 67% 77% 68%	376 31 277 1134	114 0 252 381 118 1
HOUBE50	948519	490	HMMER 1.8	PFAM: Carboxylesterases	PF00135	55.97	16	243

HAJAV28	1165229	194	blastx.2	Neurologin 3 isoform HNL3s (Fragment).	sp AAAF71231 AAAF71 231	70%	31	243
			blastx.14	(AK000544) unnamed protein product [Homo sapiens]	gi 7020711 dbj BAA9 1243.1	95% 100%	96 1064	111 8 134 5
HJAV28	948630	491	HMMER 2.1.1	PFAM: Actin	PF00022	35.9	120	230
			blastx.2	Uncharacterized hypothalamus protein HARP11.	sp AAAF67655 AAAF67 655	97%	96	458
HAQBZ89	1083554	195	blastx.14	strong similarity to class- III of 1 elegans]	gi 1707274 gb AAB3 7999.1	49% 38% 52% 54% 58%	249 594 873 1 186	578 881 992 72 221
HAQBZ89	949061	492	HMMER 1.8	PFAM: Aminotransferases class- III pyridoxal-phosphate	PF00202	62.49	68	325
			blastx.2	CG8745 PROTEIN.	sp Q9VU95 Q9VU95	52%	8	316
HELHF07	949067	196	HMMER 1.8	PFAM: Aminotransferases class- III pyridoxal-phosphate	PF00202	38.85	95	295
			blastx.14	4-aminobutyrate aminotransferase (EC 2.6.1.19) 1 1 aminotransferase). [Escherichia coli]	gi 1742132 dbj BAA1 4871.1	85% 92% 45% 100%	83 21 246 1	295 98 311 18
HE9QQ22	1127726	197	blastx.14	(AB002584) beta-alanine- pyruvate aminotransferase	gi 1944136 dbj BAA1 9549.1	77% 80%	92 418	418 585

				1					85%	587	628
HE9QQ22	949080	493	HMMER 2.1.1	PFAM: Aminotransferases class-III pyridoxal-phosphate	PF00202				100%	677	697
			blastx.2	ALANINE-- GLYOXYLATE AMINOTRANSFERASE 2 PRECURSOR (EC 1.1.	sp Q64565 AGT2_RAT			51% 43% 49%		285	545
HDSB06	949151	494	HMMER 2.1.1	PFAM: SH3 domain	PF00018			249.3		483	647
			blastx.2	(AL133047) hypothetical protein [Homo sapiens]	emb CAB61374.1			98% 30% 33%		3 6 222	863 848 848
HACAD35	949199	199	HMMER 2.1.1	PFAM: von Willebrand factor type A domain	PF00092			70.8		1461	117
			blastx.2	SIMILAR TO COCH-5B2.	sp Q9UDN0 Q9UDN0			99% 100% 95% 22% 50%		1464 947 657 944 1005	952 648 457 663 952
HEQA17	949358	200	HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001			94.57		741	436
			blastx.2	Orphan seven-transmembrane receptor.	sp AAF59827 AAF59827			84%		786	295
HMTBB17	950884	495	HMMER 1.8	PFAM: EF hand	PF00036			15.74		285	202
			blastx.2	CDNA FLJ10466 FIS,	sp BAA91628 BAA9			100%		513	100

HKGDE58	945039	496		blastx.2	CLONE NT2RPI001665. CDNA FLJ10466 FIS, CLONE NT2RPI001665.	1628	sp BAA91628 BAA91628	86% 30% 55% 36% 35%	17 281 697 690 32	835 691 825 914 208
HKGDE58	950885	497		HMMER 1.8	PFAM: EF hand	PF000036		15.98	304	221
				blastx.14	(AJ133836) calmodulin 2 [Branchiostoma floridae]	gi 4581211 emb CAB40132.1		28% 37%	337 166	179 119
HCHMW40	1144323	203		blastx.14	calmodulin [Plasmodium falciparum]	gi 385234 gb AAA29508.1		60% 49% 38% 36% 32%	376 136 349 157 481	564 348 573 345 564
HCHMW40	951518	498		HMMER 2.1.1	PFAM: EF hand	PF000036		129.9	486	572
				blastx.2	Calmodulin-like skin protein.	sp AAF66821 AAF66821		98%	135	572
HE8QZ34	1143411	204		blastx.14	predicted using Genefinder; similar to EF hand (2 domains) [Caenorhabditis elegans]	gi 3875264 emb CAB01132.1		39% 50% 40% 32% 26%	941 437 695 227 1082	120 1 595 877 412 118 3
HE8QZ34	952283	499		HMMER 1.8	PFAM: EF hand	PF000036		12.97	543	617
				blastx.2	CG4662 PROTEIN.	sp Q9VDT8 Q9VDT8		38%	249	980

HWAFG04	1227627	205	blastx.14	PRO1038.		sp AAF71042 AAF71042	42% 33%	249 977	878 108 4
HWAFG04	952878	500	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF000069		56% 44%	5 536	550 745
			blastx.14	(AC002343) Ser/Thr protein kinase isolog [Arabidopsis thaliana]	gi 2262107 gb AAB63615.1	93.74	1655	945	
HTEKT33	953308	501	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF000069		41% 48% 42% 75%	1655 1319 1046 1355	138 3 118 5 933 133 2
HBXDM07	953622	502	blastx.2	(AC007661) putative protein kinase [Arabidopsis thaliana]	gb AAD32787.1 AC007661_24		41% 36% 29%	722 1070 428	100 9 124 3 628
			HMMER 2.1.1	PFAM: Sec1 family	PF00995	96.7	267	575	
HFPFA83	955614	208	blastx.2	Vacuolar protein sorting 33B.	sp AAF91174 AAF91174		83% 97% 35%	141 1 587	728 141 706
			HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	107.6	316	681	
			blastx.2	G-protein coupled	pir JC7289 JC7289		98%	202	735

HKADO36	956115	503	HMMER 1.8	receptor, SREB3 - human PFAM: Sugar (and other) transporters	PF00083	44.03	2	277
HFXXG51	956596	210	HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	121.54	506	147
			blastx.2	No definition line found [Escherichia coli]	gb AAB18499.1	100%	560	982
HFPHR82	957528	504	HMMER 2.1.1	PFAM: Actin	PF00022	91.7	1322	357
			blastx.2	Uncharacterized hypothalamus protein HARP11.	sp AAF67655 AAF67 655	100%	1523	273
HISAF59	959140	212	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	89.46	340	771
			blastx.14	(AC002343) Ser/Thr protein kinase isolog [Arabidopsis thaliana]	gi 2262107 gb AAB6 3615.1	39% 33%	460 397	768 468
HCEHD66	1136122	213	blastx.14	neuronal calcium sensor [Rattus norvegicus]	gi 498032 gb AAA88 510.1	98%	2	562
HCEHD66	959160	505	HMMER 2.1.1	PFAM: EF hand	PF00036	64.2	311	397
			blastx.2	Neuronal calcium sensor- 1.	sp AAD01642 AAD0 1642	100%	14	583
HE8UY74	1163590	214	blastx.14	(AF080119) contains similarity to protein kinase I	gi 3600036 gb AAC3 5524.1	38% 68% 61%	13 367 464	291 441 502
HE8UY74	960914	506	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	36.37	114	407
			blastx.14	(AF080119) contains	gi 3600036 gb AAC3	36%	117	290



				similarity to protein kinase 1	5524.1		45%	13	111
HAHY08	962113	215	HMMER 1.8 blastx.14	PFAM: Eukaryotic protein kinase domain similar to tyrosine kinase [Caenorhabditis elegans]	PF00069		74.92	39	278
H2CBH45	963811	507	HMMER 1.8 blastx.2	PFAM: Src homology domain 3 Kryn [Mus musculus]	PF00018		13	194	310
HVMAM0 9	963814	508	HMMER 1.8 blastx.2	PFAM: Src homology domain 3 (AK001580) unnamed protein product [Homo sapiens]	PF00018		4.79	728	802
HPEN04	1199663	218	blastx.14	CG8745 PROTEIN.	sp Q9VU95 Q9VU95		65%	156	617
							60%	696	938
							65%	948	112
							66%	1335	1
							35%	1164	141
							50%	612	5
									133
									1
									689
HPEN04	964824	509	HMMER	PFAM:	PF00202		33.54	259	489

		1.8	Aminotransferases class-III pyridoxal-phosphate						
		blastx.2	CG8745 PROTEIN.					148	492
HSLJD02	1104452	blastx.14	UhpC protein [Escherichia coli]	219		sp Q9VU95 Q9VU95	62%	145	927
HSLJD02	965826	HMMER 1.8	PFAM: Sugar (and other) transporters	510		gi 48114 gb AAA24722.1			
		blastx.2	UhpC protein [Escherichia coli]			PF00083	19.53	464	874
		blastx.14	Sulfate transporter.	220		gb AAA24722.1	100%	56	907
HDPFZ30	1220164					sp CAC05432 CAC05432	55%	1684	151
							48%	1433	7
							32%	1154	133
							50%	180	5
							35%	1199	996
								139	139
								114	114
								0	0
HDPFZ30	966752	HMMER 2.1.1	PFAM: Sulfate transporter family	511		PF00916	60.2	1496	123
		blastx.2	(AF180728) sulfate transporter [Drosophila melanogaster]			gb AAD53951.1	28%	175	807
							52%	14	196
HPJCR33	966758	HMMER 1.8	PFAM: C2 domain	512		PF00168	31.15	13	267
		blastx.2	E3 UBIQUITIN LIGASE SMURF1 (FRAGMENT).			sp Q9JUT8 Q9JUT8	89%	7	375
HTOAK34	966800	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	513		PF00069	32.41	1020	119
		blastx.14	(AF084205)			gi 3452473 gb AAC7	75%	954	119

HE8NI24	971296	223	HMMER 1.8	serine/threonine protein kinase TAO1 [Rattus norvegicus]	1014.1				0
HAMFM39	1055532	224	blastx.2	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	61.74	453	707	
			blastx.14	G-protein coupled receptor, SREB2 - human (AK001509) unnamed protein product [Homo sapiens]	pir T47131 T47131 gi 7022807 dbj BAA9 1729.1	93% 88% 53% 100%	345 722 3860 4171	707 748 343 2 410 6	
HAMFM39	971347	514	HMMER 1.8	PFAM: Src homology domain 3	PF00018	67.14	1136	130 6	
			blastx.2	(AK001509) unnamed protein product [Homo sapiens]	dbj BAA91729.1	59%	4511	401 7	
HBGMG39	971414	515	HMMER 1.8	PFAM: EF hand	PF00036	10.69	61	141	
			blastx.2	45 KDA CALCIUM- BINDING PROTEIN PRECURSOR (STROMAL 1	sp Q61112 CB45_M OUSE	94%	7	165	
HSXBV89	1128699	226	blastx.2	TYPE I TRANSMEMBRANE RECEPTOR PRECURSOR.	sp Q9UJ47 Q9UJ47	93% 29% 29%	7 313 742	203 7 104 4 146 4	
	971821	516	HMMER	PFAM: Sushi domain	PF00084	43.6	123	290	

HSXBV89		2.1.1 blastx.2	(SCR repeat) TYPE I TRANSMEMBRANE RECEPTOR PRECURSOR.	sp Q9UJ47 Q9UJ47	82% 32%	3 96	635 536
HBIOZ10	1143756	227 blastx.14	(AF003134) strong similarity to the CDC2/CDX 1	gi 2088685 gb AAB5 4139.1	43%	3	497
HBIOZ10	973131	517 HMMER 1.8 blastx.2	PFAM: Eukaryotic protein kinase domain (AF003134) strong similarity to the CDC2/CDX subfamily of ser/thr protein kinases [Caenorhabditis elegans]	PF00069  gb AAB54139.1	121.1  60%	3 3	365 305
HTLEJ11	1085651	228 blastx.14	(AF144573) Mx- interacting protein kinase PKM [Mesocricetus auratus]	gi 4868443 gb AAD3 1319.1 AF144573_1	69% 40% 42% 38%	35 437 293 877	268 592 397 939
HTLEJ11	973302	518 HMMER 2.1.1 blastx.14	PFAM: Eukaryotic protein kinase domain (AF144573) Mx- interacting protein kinase PKM [Mesocricetus auratus]	PF00069  gi 4868443 gb AAD3 1319.1 AF144573_1	55.9  69% 40% 42% 38%	44  35 437 293 877	223  268 592 397 939
HAWAM6 9	1207835	229 blastx.14	SPARC-RELATED PROTEIN.	sp Q9WVN9 Q9WV N9	63% 53% 53% 52% 48%	580 193 961 49 223	972 438 122 4 198

HAWAM6 9	943104	519	blastx.2	SPARC-RELATED PROTEIN.	sp Q9WVVN9 Q9WV N9		46%	640	333
							23%	382	756
							34%	343	624
							50%	604	411
							33%	760	657
							28%	1025	831
							38%	2238	112
									0
									230
									0
HAWAM6 9	973465	520	HMMER 1.8	PFAM: EF hand	PF00036		10.13	97	26
			blastx.14	(AF070470) SPARC-related protein [Mus musculus]	gi 5305327 gb AAD4 1590.1 AF070470_1		62%	133	5
HCKD11	1056288	230	blastx.14	(AJ243342) nicotinic acetylcholine receptor alpha 9 subunit [Homo sapiens]	gi 6688136 emb CAB 65091.1		98%	1292	183
							88%	2347	1
							100%	54	288
							33%	3000	6
							35%	2938	203
									310
									7
									298
									8
HCKD11	973894	521	HMMER 1.8	PFAM: Neurotransmitter-gated ion-channel	PF00065		31.56	147	257
			blastx.2	(AJ243342) nicotinic	emb CAB65091.1		90%	120	296

HDPLT62	973945	522	HMMER 1.8 blastx	acetylcholine receptor alpha 9 subunit [Homo sapiens] PFAM: Neurotransmitter-gated ion-channel GABA receptor rho-3 subunit precursor [Rattus norvegicus]	PF00065 dbj BAA09322.1	102.12 78% 92%	417 414 262	746 797 411
HTPFX16	974296	232	HMMER 2.1.1 blastx.2	PFAM: PMP-22/EMP/MP20/Claudin family CLAUDIN-18.	PF00822 sp P56857 CLDI_MO USE gi 6472874 dbj BAA8 7066.1	50.2 67% 44%	48 39 316	299 359 483
HE9NO66	1079624	233	blastx.14	(AB035267) Nck-interacting kinase-like embryo specific kinase [Mus musculus]	gi 6472874 dbj BAA8 7066.1	82% 94% 80%	449 2 748	775 283 990
HE9NO66	974353	523	HMMER 1.8 blastx.14	PFAM: Eukaryotic protein kinase domain (AB020741) NIK-related kinase [Mus musculus]	PF00069 gi 6009519 dbj BAA8 4943.1	121.6 73% 94% 79%	473 449 2 748	757 817 283 990
HSDJI44	1154068	234	blastx.14	(AE000180) 7,8-diaminopelargonic acid synthetase [Escherichia coli]	gi 1786991 gb AAC7 3861.1	94% 98%	803 1828	184 9 208 8
HSDJI44	974784	524	HMMER 2.1.1 blastx.14	PFAM: Aminotransferases class-III pyridoxal-phosphate (AE000180) 7,8-	PF00202 gi 1786991 gb AAC7	511.4 99%	894 795	183 5 184

HFNDP53	578868	525	HMMER 1.8	diaminopelargonic acid synthetase [Escherichia coli]	3861.1]	100%	1837	1 186 0
HWADY66	734565	236	HMMER 1.8	PFAM: CUB domain	PF00431	11.77	21	77
HLDBC63	1144557	237	blastx.14	PFAM: Eukaryotic protein kinase domain	PF00069	28.82	1	174
HLDBC63	745061	526	HMMER 2.1.1	carnitine palmitoyltransferase I [Homo sapiens]	gi 755646 gb AAC41 748.1	99%	3	629
HFIVB68	752981	527	HMMER 1.8	PFAM: Carnitate acyltransferase	PF00755	258.4	3	410
HTLAC56	1181355	239	blastx.14	PFAM: C2 domain	PF00168	35.53	406	570
HTLAC56	753093	528	HMMER 2.1.1	hypothetical protein DKFZp564E1616.1 - human (fragments)	pir T12449 T12449	93% 97% 97% 96% 68% 36% 27% 36% 54%	187 692 588 104 3 573 406 397 125	615 835 692 184 107 668 543 465 157
HSSAD41	753094	240	HMMER 2.1.1	carnitine palmitoyltransferase I [Homo sapiens]	gi 755646 gb AAC41 748.1	54%	6	599
				PFAM: Carnitate acyltransferase	PF00755	143.3	6	422
				PFAM: Carnitate acyltransferase	PF00755	90.8	51	299

HCFMT57	765375	529	HMMER 1.8	PFAM: Src homology domain 3	PF00018	14.55	107	3
			blastx.2	(AF039571) peripheral benzodiazepine receptor interacting protein; PBR- IP/PRAX1 [Homo sapiens]	gb AAD11957.1	96%	377	3
HDAAV61	810305	530	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	41.11	11	145
HDPKD75	1096253	243	blastx.14	(AF191838) TANK binding kinase TBK1 [Homo sapiens]	gi 6224868 gb AAF05 989.1 AF191838_1	100%	74	637
HDPKD75	810824	531	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	98.74	68	433
HTEON29	1126312	244	blastx.14	(AB021866) CIB [Homo sapiens]	gi 4092850 dbj BAA3 6281.1	50% 47% 57% 48%	190 394 103 1	339 501 186 111
	815852	532	HMMER 1.8	PFAM: EF hand	PF00036	22.29	266	349
HTEON29			blastx.2	CALCIUM-AND INTEGRIN-BINDING PROTEIN CIB.	sp Q9R010 Q9R010	41%	2	496
	1121800	245	blastx.14	(AF144573) Mx- interacting protein kinase PKM [Mesocricetus auratus]	gi 4868443 gb AAD3 1319.1 AF144573_1	94% 77% 100% 88%	37 464 17 484	453 490 43 510
HSKAC24	823869	533	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	79.36	122	454
HTJAA71	846682	534	HMMER	PFAM: S-100/ICaBP type	PF01023	36.3	77	208



			2.1.1	calcium binding domain				
			blastx.2	TUMOR RELATED PROTEIN.	sp Q9UBG3 Q9UBG3	70%	68	325
HTEKS20	1124378	247	blastx.14	calcineurin [Bos taurus]	gi 312969 emb CAA50659.1	77%	53	562
HTEKS20	846714	535	HMMER 2.1.1	PFAM: EF hand	PF00036	84.7	453	539
			blastx.2	calcineurin regulatory chain - human	pir A33391 A33391	77%	60	569
HE9TK49	856343	536	HMMER 1.8	PFAM: Ion transport proteins	PF00520	77.02	11	256
			blastx.2	(AB012043) NBR13 [Homo sapiens]	dbj BAA36409.1	95% 50% 37%	2 256 259	256 327 282
HCHAT01	867209	537	HMMER 1.8	PFAM: EF hand	PF00036	24.01	1227	130
			blastx.2	AD 3 (FRAGMENT).	sp Q9UQ32 Q9UQ32	47% 72% 57% 79%	795 14 472 375	140 9 367 783 476
HCEEN06	1150867	250	blastx.14	(AB025258) granuphilin-a [Mus musculus]	gi 5926736 dbj BAA84656.1	32% 48% 47% 42%	296 548 242 152	490 652 298 229
HCEEN06	878658	538	HMMER 1.8	PFAM: C2 domain	PF00168	51.79	203	466
HDPKI83	883382	251	HMMER 1.8	PFAM: C2 domain	PF00168	13.47	530	601

			blastx.2	MUNC13-4 PROTEIN.	sp Q9R189 Q9R189	76%	194	631
HSPBQ12	1152258	252	blastx.14	copine I [Homo sapiens]	gi 1791257 gb AAC15920.1	95%	735	794
HSPBQ12	884004	539	HMMER 1.8	PFAM: C2 domain	PF00168	80%	661	738
HPCID78	886915	253	HMMER 2.1.1	PFAM: Sulfate transporter family	PF00916	73%	55	570
			blastx.2	(AF030880) pendrin [Homo sapiens]	gb AAC51873.1	63%	570	851
HDTKQ14	886936	254	HMMER 1.8	PFAM: Src homology domain 3	PF00018	42.06	352	624
			blastx.2	(AL049683) hypothetical protein [Homo sapiens]	emb CAB41255.1	26.4	265	381
HRACK83	888037	255	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	40%	25	375
HSIAO78	889498	540	HMMER 1.8	PFAM: EF hand	PF00036	12.87	430	546
			blastx.2	HYPOTHETICAL 22.5 KDA PROTEIN.	sp O43745 O43745	100%	439	555
HWAGS73	894404	257	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	56%	76	291
HCMSL08	898203	258	HMMER 2.1.1	PFAM: Calsequestrin	PF01216	48.4	211	423
			blastx.2	calsequestrin precursor, fast skeletal muscle - human	pir A60424 A60424	19.91	389	463
	959176	541	HMMER	PFAM: Calsequestrin	PF01216	97%	38	622
						64.17	4	273
						1001.1	52	122
						95%	112	119
								7
						697.4	1372	569

HCMSL08			2.1.1										
			blastx.14	calmitine; calsequestrine [Homo sapiens]	gi 688292 gb AAB32063.1	93%	1372	593					
HLWFN63	1101533	259	blastx.14	(AL049683) hypothetical protein [Homo sapiens]	gi 4678753 emb CAB41255.1	45% 75%	470 989	937 102					
HLWFN63	908437	542	HMMER 1.8	PFAM: Src homology domain 3	PF00018	12.81	515	664					
			blastx.2	(AL049683) hypothetical protein [Homo sapiens]	emb CAB41255.1	44%	464	102					
HPWAY10	908549	543	HMMER 2.1.1	PFAM: KRAB box	PF01352	156.3	206	394					
			blastx.14	zinc finger protein 30 [Mus musculus domesticus]	gi 456269 emb CAA82913.1	70% 67%	152 326	325 454					
HOUDH19	1153909	261	blastx.14	(AC007842) BC331191_1 [Homo sapiens]	gi 5080758 gb AAD39268.1 AC007842_3	100%	57	335					
HOUDH19	908588	544	HMMER 2.1.1	PFAM: KRAB box	PF01352	169.7	241	429					
			blastx.2	(AC007842) BC331191_1 [Homo sapiens]	gb AAD39268.1 AC007842_3	91%	226	549					
HDPFF24	909232	545	HMMER 2.1.1	PFAM: KRAB box	PF01352	121.3	158	349					
			blastx.2	(AC007228) R31665_2 [AA 1- 673 ] [Homo sapiens]	gb AAD23606.1 AC007228_1	50%	158	457					
HWLFH94	1152278	263	blastx.14	(AK000265) unnamed protein product [Homo sapiens]	gi 7020230 dbj BAA91041.1	41% 53% 57%	739 595 335	939 690 397					

HWLFH94	909682	546	HMMER 1.8	PFAM: Src homology domain 3	PF00018	58.42	308	463
			blastx.2	(AK000265) unnamed protein product [Homo sapiens]	dbj BAA91041.1	40%	215	535
HWMBM1 3	1152283	264	blastx.14	(AK000265) unnamed protein product [Homo sapiens]	gi 7020230 dbj BAA9 1041.1	56% 41%	153 345	296 545
			HMMER 1.8	PFAM: Src homology domain 3	PF00018	59.64	126	281
HWMBM1 3	909683	547	blastx.2	Eps8 [Mus musculus]	gb AAAI6358.1	35% 37%	33 324	317 527
			blastx.14	(AB037134) IRE homolog 1 [Arabidopsis thaliana]	gi 6729348 dbj BAA8 9784.1	53% 40% 28%	868 1126 526	113 4 125 1 684
HFIE75	909758	548	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	85.68	377	664
			blastx.14	(AD000092) hypothetical human serine-threonine protein kinase R31240.1 [Homo sapiens]	gi 1905906 gb AAB5 1171.1	43% 46% 47%	362 632 724	634 715 774
HNTCP13	909770	549	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	102.96	445	930
			blastx.14	(AC006530) unknown [Homo sapiens]	gi 4809337 gb AAD3 0182.1 AC006530.4	55%	463	957
HBIBQ89	909782	550	HMMER 2.1.1	PFAM: SH3 domain	PF00018	49.7	212	376

			blastx.2	p115 [Homo sapiens]	emb CAA55394.1	41%	14	397
HWBEG18	909798	551	HMMER 2.1.1	PFAM: EF hand	PF00036	33.3	505	591
			blastx.2	RAS ACTIVATOR RASGRP.	sp Q9UNN9 Q9UNN 9	55% 71% 48%	103 698 2	684 889 142
HTAHB43	1221956	269	blastx.14	PUTATIVE RASGAP- ACTIVATING-LIKE PROTEIN.	sp O43374 O43374	99% 100% 97% 34% 31% 57%	153 2174 42 45 429 1436	217 4 235 6 164 140 524 147 7
			HMMER 2.1.1	PFAM: GTPase-activator protein for Ras-like GTPase	PF00616	61.3	519	731
HTAHB43	909845	552	blastx.2	PUTATIVE RASGAP- ACTIVATING-LIKE PROTEIN.	sp O43374 O43374	97% 100%	39 1	860 33
			HMMER 1.8	PFAM: C2 domain	PF00168	41.14	46	189
HSYBX32	909846	270	blastx.2	PUTATIVE RASGAP- ACTIVATING-LIKE PROTEIN.	sp O43374 O43374	98%	49	228
			HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	30.78	210	347
HCEHE35	909937	553	blastx.14	protein kinase PRK2 [human, DX3 B-cell	gi 914100 gb AAB33 346.1	66%	204	365

HFCBB56	1204971	272	blastx.14	myeloma cell line, Peptide, 984 aa] [Homo sapiens]	pir S62358 S62358	44% 31% 26%	280 439 598	387 612 744
HFCBB56	910073	554	HMMER 1.8	inositol 1,4,5-trisphosphate-binding protein, 130K - rat	PF00036	23.95	431	514
			blastx.2	1-phosphatidylinositol-4,5-bisphosphate phosphodiesterase 1	pir S14113 S14113	36%	275	565
HAMFL82	910074	273	HMMER 1.8	PFAM: C2 domain	PF00168	73.4	9	212
			blastx.2	PHOSPHOLIPASE C-L2.	sp Q9QYG1 Q9QYG1	97%	3	317
HBXCM38	1174533	274	blastx.14	unnamed protein product [unidentified]	gi 6740727 emb CAB69447.1	97% 87%	405 13	134 9 396
HBXCM38	910086	555	HMMER 1.8	PFAM: Src homology domain 3	PF00018	55.89	1062	123
			blastx.2	unnamed protein product [unidentified]	emb CAB69447.1	92% 87% 77%	402 13 1295	131 6 396 134 8
HLHCR16	910123	275	HMMER 2.1.1	PFAM: Sushi domain (SCR repeat)	PF00084	744.9	197	358
			blastx.2	complement receptor 1 - chimpanzee (fragment)	pir J36936 J36936	29% 30% 31%	710 1166 818	160 0 192

[illegible]

1958	30%			1
710	28%			163
1163	29%			6
1757	29%			276
1766	28%			4
911	31%			151
1970	26%			3
1754	27%			192
1166	28%			1
2378	30%			263
20	36%			2
1244	29%			263
2210	26%			2
2210	26%			163
11	32%			6
11	32%			303
710	32%			1
11	32%			260
710	32%			5
23	30%			192
992	30%			1
710	32%			303
23	29%			1
23	36%			562
20	33%			192
32	27%			1
728	29%			316
983	30%			3
728	28%			316
713	31%			3

[illegible]



[illegible]

25%	2474	124
25%	1721	6
27%	1100	111
29%	893	7
35%	11	111
26%	1721	4
27%	2555	574
26%	1721	574
33%	182	298
26%	1100	3
29%	2549	224
30%	1997	2
30%	38	310
32%	1241	9
30%	626	460
30%	734	163
25%	1250	9
24%	1250	111
30%	38	1
31%	95	547
31%	95	298
31%	734	3
26%	1769	313
31%	725	0
31%	725	310
29%	1799	9
25%	1472	117
30%	593	1
22%	371	153
		7

FOFFO" 92849260

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136							
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364							
232							
6							
332							



HLHCR16	965511	556	HMMER 2.1.1 blastx.2	PFAM: Sushi domain (SCR repeat) furrowed [Drosophila melanogaster]	PF00084 gb AAB36703.1	357.8	197	101 5 205 6 188 2 847 598
						31% 28% 34% 28% 35% 32% 34% 30% 30% 32% 27% 27% 34% 28% 30% 37% 29%	638 254 737 254 89 908 692 740 419 11 17 17 1100 11 977 365 1220	148 0 122 8 138 7 112 0 604 146 8 118 9 127 0 101 8 529 916 553



				GLGF).					
				blastx.2	(AF162130) MAGUK protein TEM-61 [Homo sapiens]	gb AAD45919.2 AF162130_1	91% 98%	196 23	846 193
HAGGF84	911312	559		HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	105.85	10	318
				blastx.14	calmodulin-dependent protein kinase II-delta dash [Oryctolagus cuniculus]	gi 3241849 dbj BAA28870.1	88% 87% 100%	10 366 320	363 413 364
	1119031	279		blastx.14	(AL049683) hypothetical protein [Homo sapiens]	gi 4678753 emb CAB41255.1	63% 58%	8 263	205 451
HTTKP07	911390	560		HMMER 1.8	PFAM: Src homology domain 3	PF00018	15.82	47	196
				blastx.2	(AL049683) hypothetical protein [Homo sapiens]	emb CAB41255.1	51% 56%	8 292	289 450
HE9SE62	911476	561		HMMER 1.8	PFAM: Src homology domain 3	PF00018	47.65	268	435
				blastx.2	(AK000007) FLJ00007 protein [Homo sapiens]	dbj BAA92232.1	43% 64%	4 877	435 927
HUJAD24	1162674	281		blastx.14	serine/threonine kinase [Rattus norvegicus]	gi 2052191 emb CAB06295.1	34% 48% 34% 57% 51% 72% 42% 24% 72% 42%	457 363 797 285 141 1679 9 75 229 180	777 512 928 362 233 173 2 71 224 261

HUJAD24	911498	562	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	34.73	9	236
			blastx.14	AMP-activated protein kinase homolog [Homo sapiens]	gi 758783 gb AAA64 850.1	45% 45% 37% 54% 41%	336 123 267 211 45	467 215 338 243 95
HWLFG75	1228123	282	blastx.14	DJ63M2.4 (novel protein).	sp CAC08483 CAC0 8483	81% 91% 100%	472 862 1140	861 107 4 116 3
HWLFG75	916563	563	HMMER 2.1.1	PFAM: EF hand	PF00036	24.1	187	273
			blastx.2	DJ63M2.4 (novel protein).	sp CAC08483 CAC0 8483	89% 75% 100%	720 457 1123	105 8 717 114 6
HT3BG12	921593	564	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	27.09	109	183
			blastx.14	CYCLIN-DEPENDENT KINASE (CDK)8 [unidentified]	gi 3715669 emb CAA 03585.1	85%	1	246
HTLJC71	922923	284	HMMER 1.8	PFAM: Src homology domain 3	PF00018	9.14	1152	134 0
			blastx.2	(AL133030) hypothetical protein [Homo sapiens]	emb CAB61362.1	94%	3	135 5
HCOMM0	1194701	285	blastx.14	epidermal growth factor	pir I38728 I38728	44%	455	721

5					receptor kinase substrate - human			59%	188	370
HCOMM0 5	925952	565	HMMER 1.8	PFAM: Src homology domain 3	PF00018		59.48	178	342	
			blastx.2	epidermal growth factor receptor kinase substrate [Homo sapiens]	gb AAA62280.1	46%	445	840		
	926924	566	HMMER 2.1.1	PFAM: Pyridoxal-dependent decarboxylase conserved domain	PF00282		35.8	342	536	
HSLJE54			blastx.2	CYSTEINE SULFINIC ACID DECARBOXYLASE-RELATED PROTEIN 4.	sp Q9UNJ5 Q9UNJ5		98%	198	548	
						92%	542	739		
HTGED07	927411	287	HMMER 2.1.1	PFAM: Sec1 family	PF00995		85%	721	885	
			blastx.2	VESICLE TRANSPORT-RELATED PROTEIN.	sp Q9Y6A8 Q9Y6A8	100%	885	908		
HOFNH30	928365	288	HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001		128.9	34	297	
						89%	25	309		
				blastx.2	CALCIUM-MOBILIZING LYSOPHOSPHATIDIC ACID RECEPTOR 1	sp Q9UBY5 Q9UBY5		24.58	9	248
							75%	18	263	
							54%	265	375	



HWNCY05	1179767	289	blastx.14	GOK [Homo sapiens]	gi 2264346 gb AAC51627.1	65%	10	951
HWNCY05	928789	567	HMMER 1.8	PFAM: EF hand	PF00036	12.55	18	101
			blastx.2	GOK.	sp Q13586 Q13586	60%	6	129
HDPDA47	929193	290	HMMER 1.8	PFAM: Src homology domain 3	PF00018	12.52	691	810
			blastx.2	(AL049683) hypothetical protein [Homo sapiens]	emb CAB41255.1	69% 53%	145 945	102 6 102
HWMEV6 3	931154	291	HMMER 2.1.1	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	53.4	2	262
			blastx.2	7 transmembrane G-protein coupled receptor.	sp AAG09275 AAG09275	75%	2	391
HCFAT25	1052857	292	blastx.14	(AF096300) HPK/GCK-like kinase HGK [Homo sapiens]	gi 4322936 gb AAD16137.1	72%	2	412
HCFAT25	932068	568	HMMER 2.1.1	PFAM: Eukaryotic protein kinase domain	PF00069	26.6	136	231
			blastx.14	(AF096300) HPK/GCK-like kinase HGK [Homo sapiens]	gi 4322936 gb AAD16137.1	63% 72% 25%	91 60 232	456 158 312
HHEQV39	1165420	293	blastx.14	(AF037261) SH3-containing adaptor molecule-1 [Homo sapiens]	gi 3004948 gb AAC09244.1	50% 41% 40% 36%	517 625 396 141	606 696 470 215

HHEQV39	932851	569	HMMER 1.8	PFAM: Src homology domain 3	PF00018	30.41	526	708
HHFJH79	933308	570	HMMER 1.8 blastx.2	PFAM: von Willebrand factor type A domain R31181_2, PARTIAL PROTEIN (FRAGMENT).	PF00092 sp O95783 O95783	12.76 99%	62 14	232 316
HUCOW17	1155190	295	blastx.2	RHOGAP PROTEIN.	sp Q98935 Q98935	61% 62%	4 787	441 987
HUCOW17	933357	571	HMMER 1.8 blastx.2	PFAM: Src homology domain 3 Graf protein [Homo sapiens]	PF00018 emb CAA71414.2	20.28 67% 50% 83% 40%	647 1 608 756 187	739 261 751 809 246
HFKIT06	934019	572	HMMER 1.8 blastx.14	PFAM: Eukaryotic protein kinase domain p58 galactosyltransferase- associated protein kinase - human	PF00069 pir A38282 A38282	34.65 51% 40%	160 178 74	270 270 118
HDTBY88	1104159	297	blastx.14	(AF130372) serine- threonine protein kinase 1	gi 7108631 gb AAF36 509.1 AF130372_1	87% 98% 100%	186 3 497	491 170 535
HDTBY88	934472	573	HMMER 2.1.1 blastx.14	PFAM: Eukaryotic protein kinase domain p56 KIAMRE protein kinase [Homo sapiens]	PF00069 gi 1517820 gb AAC5 0918.1	93.6 82% 35% 100%	3 3 192 492	302 170 458 509
HWLHS82	1082268	298	blastx.2	(AC005581) R31237_1,	gb AAC33487.1	93%	162	902

				partial CDS [Homo sapiens]			88% 100%	1049 96	123 7 170
HWLHS82	934505	574	HMMER 2.1.1	PFAM: Eukaryotic protein kinase domain	PF00069		147.2	2	319
			blastx.2	(AC005581) R31237_1, partial CDS [Homo sapiens]	gb AAC33487.1		90% 100% 40%	68 2 306	364 76 422
HDPNC96	1081629	299	blastx.14	HUMAN NDR [unidentified]	gi 2304746 emb CAA03387.1		92%	3	734
HDPNC96	934520	575	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069		206.63	3	734
			blastx.14	HUMAN NDR [unidentified]	gi 2304746 emb CAA03387.1		92%	3	734
HCE5178	1197899	300	blastx.14	rabphilin-3A - bovine	pir A48097 A48097		95% 68%	191 11	112 6 97
HCE5178	934531	576	HMMER 1.8	PFAM: C2 domain	PF00168		49.14	213	413
			blastx.2	rabphilin-3A - bovine	pir A48097 A48097		83% 61%	135 3	404 41
HISDS62	1159625	301	blastx.14	(AJ250425) Collybistin I [Rattus norvegicus]	gi 6706318 emb CAB65966.1		90%	185	892
HISDS62	935932	577	HMMER 2.1.1	PFAM: RhoGEF domain	PF00621		51.3	229	486
			blastx.2	(AJ250425) Collybistin I [Rattus norvegicus]	emb CAB65966.1		96%	1	483
HDQDV69	937850	578	HMMER 2.1.1	PFAM: Eukaryotic protein kinase domain	PF00069		212.5	68	598

HEMBT61	939957	303	blastx.2	(AF169035) protein kinase [Homo sapiens] PFAM: Eukaryotic protein kinase domain	gb AAF12758.1 AF169035_1 PF00069	98%	68	829
HRODZ70	1088554	304	HMMER 2.1.1	kinase domain	PF00069	76.6	16	285
			blastx.2	(AD000092) hypothetical human serine-threonine protein kinase R31240_1 [Homo sapiens]	gb AAB51171.1	71%	13	441
HRODZ70	942673	580	blastx.2	kinase like protein [Arabidopsis thaliana]	emb CAB10257.1	39%	254	544
			HMMER 2.1.1	kinase domain	PF00069	50%	524	601
HHERQ79	944057	581	blastx.2	kinase domain	PF00069	78.2	33	248
			HMMER 1.8	kinase like protein [Arabidopsis thaliana]	emb CAB10257.1	39%	33	323
HCECM90	945088	582	blastx.2	kinase domain	PF00069	50%	303	380
			HMMER 2.1.1	(AB016589) inducible IKappaB kinase [Mus musculus]	dbj BAA85154.1	83.4	133	474
HWHGW7 2	945692	583	blastx.2	kinase domain	PF00069	90%	109	471
			HMMER 1.8	PFAM: Src homology domain 3	PF00018	53.06	392	568
HPCR84	1219890	308	blastx.2	PFAM: ATP P2X receptor	PF00864	438.5	247	855
			HMMER 2.1.1	receptor [Homo sapiens]	gb AAF19170.1 AF190822_1 sp Q61846 Q61846	91%	190	939
HPCR84	1219890	308	blastx.14	MATERNAL EMBRYONIC LEUCINE ZIPPER KINASE	sp Q61846 Q61846	94%	138	839
			blastx.14					

HPCR84	945856	585	HMMER 1.8 blastx.2	(SERINE/THREONINE 1 PFAM: Eukaryotic protein kinase domain similar to protein kinase of X.laevis, has putative 1	PF00069	75.57	157	384
HNSAA28	946988	309	HMMER 2.1.1	PFAM: SH3 domain	PF00018	149	757	915
			blastx.2	(AF146277) adapter protein CMS [Homo sapiens]	gb AAD34595.1 AF1 46277_1	82%	4	155 4
HNSAA28	972348	586	blastx.14	(AF146277) adapter protein CMS [Homo sapiens]	gi 4960047 gb AAD3 4595.1 AF146277_1	88%	21	449
HLWAR77	947484	310	HMMER 1.8	PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	214.2	1287	553
			blastx.2	G-protein coupled receptor HLWAR77.	sp AAF87078 AAF87 078	100%	1287	292
HTTJW49	1127477	311	blastx.14	(AF118838) citrin; adult- onset type II citrullinemia protein [Homo sapiens]	gi 5052319 gb AAD3 8501.1 AF118838_1	94%	516	124
						97%	101	4
						90%	1232	532
						100%	1408	138
						37%	1244	1
						40%	1411	150
						40%	1200	0
						60%	1143	137
						33%	383	8
						33%	597	147
								6 124

HTTJW49	948107	587	HMMER 1.8	PFAM: EF hand	PF00036	11.98	283	4 117 2 481 695
HWAFS18	1155193	312	blastx.2	CITRIN.	sp Q9UNI7 Q9UNI7	84%	94	627
			blastx.14	(AF156884) RIP-like kinase [Homo sapiens]	gi 5059425 gb AAD3 9005.1 AF156884_1	89%	165	171 8
HWAFS18	948434	588	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	115.98	225	632
			blastx.14	(AF156884) RIP-like kinase [Homo sapiens]	gi 5059425 gb AAD3 9005.1 AF156884_1	91% 66% 100%	165 702 632	632 773 661
HFCBA44	1082762	313	blastx.14	(AB010633) carboxylesterase precursor [Macaca fascicularis]	gi 2810987 dbj BAA2 4523.1	61%	184	639
HFCBA44	948533	589	HMMER 1.8	PFAM: Carboxylesterases	PF00135	34.24	315	485
			blastx.2	thiolesterase B (EC 3.-.-) precursor - mallard	pir A47162 A47162	56% 60% 48%	2 423 184	208 482 264
HVADT77	1180374	314	blastx.14	alpha-3 collagen type VI [Gallus gallus]	gi 211622 gb AAA03 201.1	55%	12	119
HVADT77	948886	590	HMMER 1.8	PFAM: Kunitz/Bovine pancreatic trypsin inhibitor domain	PF00014	74.41	169	321
			blastx.2	alpha-3 collagen type VI	gb AAA03201.1	43%	130	330

HUFCN91	1189013	315	blastx.14	[Gallus gallus] copine I [Homo sapiens]	gi 1791257 gb AAC1 5920.1	54% 48% 71% 75% 64%	103 561 874 540 783	540 782 936 587 833
HUFCN91	949137	591	HMMER 1.8	PFAM: von Willebrand factor type A domain	PF00092	9.83	529	729
			blastx.14	copine I [Homo sapiens]	gi 1791257 gb AAC1 5920.1	56% 48% 48% 57% 45% 64%	103 971 562 1332 899 784	588 133 3 783 143 0 100 9 834
HAGBX32	951351	316	HMMER 2.1.1	PFAM: PMP- 22/EMP/MP20/Claudin family	PF00822	182.3	3	476
			blastx.2	VOLTAGE- DEPENDENT CALCIUM CHANNEL GAMMA-3 SUBUNIT 1	sp O60359 CCG3_H UMAN	89%	12	551
HWMIB81	955336	593	HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	122.85	1458	934
			blastx.2	(AK000528) unnamed protein product [Homo sapiens]	dbj BAA91232.1	100%	3	572
HCEMU86	1156430	318	blastx.14	p87=transporter-like	gi 259174 gb AAB24	91%	10	795

					protein [cattle, Peptide, 742 aa] [Bos taurus]	028.1				
HCEMU86	956864	594		HMMER 1.8	PFAM: Sugar (and other) transporters	PF00083	24.49	2124	173	8
				blastx.2	p87=transporter-like protein [cattle, Peptide, 742 aa] [Bos taurus]	gb AAB24028.1	99%	3	788	
HRDAF83	1153911	319		blastx.14	(AF137378) integrin alpha 11 subunit precursor [Homo sapiens]	gi 5915662 gb AAD5 1919.2 AF137378_1	93%	42	338	
HRDAF83	957143	595		HMMER 1.8	PFAM: von Willebrand factor type A domain	PF00092	89.99	72	332	
				blastx.2	(AF137378) integrin alpha 11 subunit precursor [Homo sapiens]	gb AAD51919.2 AF1 37378_1	92%	36	332	
HUVGZ88	1204719	320		blastx.14	PRO1038.	sp AAF71042 AAF71 042	50% 44% 50% 30% 75%	527 974 444 732 713	988 118 3 593 851	736
HUVGZ88	959020	597		HMMER 1.8	PFAM: Eukaryotic protein kinase domain	PF00069	31.12	182	439	
HCKS55	961074	598		HMMER 1.8	PFAM: C2 domain	PF00168	4.41	931	993	
HOEET48	963290	322		HMMER 2.1.1	PFAM: EF hand	PF00036	26	656	727	
				blastx.2	Reticulocabin precursor.	sp AAG09692 AAG0 9692	96%	47	103	0



HBODE51	964235	599	HMMER 1.8 blastx.14	PFAM: Mitochondrial carrier proteins aralar1 [Homo sapiens]	PF00153	235.26	995	183 4
HHFCK09	965304	324	HMMER 2.1.1 blastx.2	PFAM: TBC domain (AL022238) dJ1042K10.2 (supported by GENSCAN, FGENSE and GENEWISE) [Homo sapiens]	gi 3559910 emb CAA 74834.1	93%	20	205 3
					PF00566	179.1	2305	165 5
HCOOZ11	965306	600	HMMER 1.8 blastx.2	PFAM: Src homology domain 3 (AL022238) dJ1042K10.2 (supported by GENSCAN, FGENSE and GENEWISE) [Homo sapiens]	emb CAA18266.1	97% 98%	2635 1276	126 8 389
					PF00018	5.22	179	214
HDPPO35	1119032	326	HMMER 1.8 blastx.14	PFAM: Src homology domain 3 (AL049683) hypothetical protein [Homo sapiens]	emb CAA18266.1	100%	182	589
					gi 4678753 emb CAB 41255.1	63% 65% 71% 65% 45% 25%	561 816 84 300 1080 117	758 980 146 359 113 9 245
HDPPO35	966248	601	HMMER 1.8 blastx.2	PFAM: Src homology domain 3 (AL049683) hypothetical protein [Homo sapiens]	PF00018	14.07	600	749
					emb CAB41255.1	39%	84	114 8
	968602	602	HMMER	PFAM: Actin	PF00022	291.1	77	111

HLWDZ53			2.1.1 blastx.2	Actin-related protein 3- beta.		sp AAC98904 AAC9 8904	99% 100%	95 54	1 6 98
HEOPL36	968826	603	HMMER 1.8 blastx.2	PFAM: Src homology domain 3 (AL049758) dJ437M21.3 (protein kinase C and casein kinase substrate in neurons 2) [Homo sapiens]		PF00018  emb CAB51395.1	79.81  99%	316  178	483  486
HMCFS02	1152252	329	blastx.14	(AK000482) unnamed protein product [Homo sapiens]		gi 7020600 dbj BAA9 1194.1	59% 40%	72 716	725 781
HMCFS02	969326	604	HMMER 1.8 blastx.2	PFAM: C2 domain  CDNA FLJ20475 FIS, CLONE KAT07206.		PF00168  sp BAA91194 BAA9 1194	8.05  59%	347  116	457  496
HDPSR15	969666	605	HMMER 1.8 blastx.2	PFAM: Eukaryotic protein kinase domain (AB026289) protein kinase SID6-1512 [Homo sapiens]		PF00069  dbj BAA85045.1	87.19  95% 89%	351  631 240	626  115 8 692
HNTAV78	971315	606	HMMER 1.8 blastx.2	PFAM: 7 transmembrane receptor (rhodopsin family)  Cysteiny1 leukotriene CysLT2 receptor.		PF00001  sp BAB03601 BAB0 3601	23.92  100%	3  3	143  266
HFKDR14	1145842	332	blastx.14	(AF128625) CDC42-		gi 5006445 gb AAD3	98%	90	127

					binding protein kinase beta [Homo sapiens]	7506.1 AF128625_1	100%	1279	7 132 0
HFKDR14	974255	607	HMMER 1.8		PFAM: Eukaryotic protein kinase domain	PF00069	244.21	297	109
			blastx.2		(AF128625) CDC42- binding protein kinase beta [Homo sapiens]	gb AAD37506.1 AF1 28625_1	98% 22%	72 1572	173 3 170 6
HDPBI30	974711	333	HMMER 1.8		PFAM: 7 transmembrane receptor (rhodopsin family)	PF00001	171.31	386	109 6
			blastx.2		G PROTEIN-COUPLED RECEPTOR.	sp Q9UNW8 Q9UN W8	93%	206	131 2
HODFF88	1094875	334	blastx.2		mixed-lineage protein kinase 1 - human	pir S32467 JU0229	73% 81%	89 763	493 969
			HMMER 1.8		PFAM: Eukaryotic protein kinase domain	PF00069	101.43	98	370
HODFF88	974911	608	blastx.14		mixed-lineage protein kinase 1 - human	pir S32467 JU0229	74% 81% 30%	131 763 751	493 921 915

[46] Table 2 further characterizes certain encoded polypeptides of the invention, by providing the results of comparisons to protein and protein family databases. The first column provides a unique clone identifier, "Clone ID NO:", corresponding to a cDNA clone disclosed in Table 1A. The second column provides the unique contig identifier, "Contig ID:" which allows correlation with the information in Table 1A. The third column provides the sequence identifier, "SEQ ID NO:", for the contig polynucleotide sequences. The fourth column provides the analysis method by which the homology/identity disclosed in the Table was determined. The fifth column provides a description of the PFAM/NR hit identified by each analysis. Column six provides the accession number of the PFAM/NR hit disclosed in the fifth column. Column seven, score/percent identity, provides a quality score or the percent identity, of the hit disclosed in column five. Comparisons were made between polypeptides encoded by polynucleotides of the invention and a non-redundant protein database (herein referred to as "NR"), or a database of protein families (herein referred to as "PFAM"), as described below.

[47] The NR database, which comprises the NBRF PIR database, the NCBI GenPept database, and the SIB SwissProt and TrEMBL databases, was made non-redundant using the computer program nrdb2 (Warren Gish, Washington University in Saint Louis). Each of the polynucleotides shown in Table 1A, column 3 (e.g., SEQ ID NO:X or the 'Query' sequence) was used to search against the NR database. The computer program BLASTX was used to compare a 6-frame translation of the Query sequence to the NR database (for information about the BLASTX algorithm please see Altshul et al., J. Mol. Biol. 215:403-410 (1990); and Gish and States, Nat. Genet. 3:266-272 (1993). A description of the sequence that is most similar to the Query sequence (the highest scoring 'Subject') is shown in column five of Table 2 and the database accession number for that sequence is provided in column six. The highest scoring 'Subject' is reported in Table 2 if (a) the estimated probability that the match occurred by chance alone is less than  $1.0e-07$ , and (b) the match was not to a known repetitive element. BLASTX returns alignments of short polypeptide segments of the Query and Subject sequences which share a high degree of similarity; these segments are known as High-Scoring Segment Pairs or HSPs. Table 2 reports the degree of similarity between the Query and the Subject for each HSP as a percent identity in Column 7. The percent identity is determined by dividing the number of exact matches between the two aligned sequences in the HSP, dividing by the number of Query amino acids in the HSP

and multiplying by 100. The polynucleotides of SEQ ID NO:X which encode the polypeptide sequence that generates an HSP are delineated by columns 8 and 9 of Table 2.

[48] The PFAM database, PFAM version 2.1, (Sonnhammer et al., Nucl. Acids Res., 26:320-322, 1998)) consists of a series of multiple sequence alignments; one alignment for each protein family. Each multiple sequence alignment is converted into a probability model called a Hidden Markov Model, or HMM, that represents the position-specific variation among the sequences that make up the multiple sequence alignment (see, e.g., Durbin et al., *Biological sequence analysis: probabilistic models of proteins and nucleic acids*, Cambridge University Press, 1998 for the theory of HMMs). The program HMMER version 1.8 (Sean Eddy, Washington University in Saint Louis) was used to compare the predicted protein sequence for each Query sequence (SEQ ID NO:Y in Table 1A) to each of the HMMs derived from PFAM version 2.1. A HMM derived from PFAM version 2.1 was said to be a significant match to a polypeptide of the invention if the score returned by HMMER 1.8 was greater than 0.8 times the HMMER 1.8 score obtained with the most distantly related known member of that protein family. The description of the PFAM family which shares a significant match with a polypeptide of the invention is listed in column 5 of Table 2, and the database accession number of the PFAM hit is provided in column 6. Column 7 provides the score returned by HMMER version 1.8 for the alignment. Columns 8 and 9 delineate the polynucleotides of SEQ ID NO:X which encode the polypeptide sequence which show a significant match to a PFAM protein family.

[49] As mentioned, columns 8 and 9 in Table 2, "NT From" and "NT To", delineate the polynucleotides of "SEQ ID NO:X" that encode a polypeptide having a significant match to the PFAM/NR database as disclosed in the fifth column. In one embodiment, the invention provides a protein comprising, or alternatively consisting of, a polypeptide encoded by the polynucleotides of SEQ ID NO:X delineated in columns 8 and 9 of Table 2. Also provided are polynucleotides encoding such proteins, and the complementary strand thereto.

[50] The nucleotide sequence SEQ ID NO:X and the translated SEQ ID NO:Y are sufficiently accurate and otherwise suitable for a variety of uses well known in the art and described further below. For instance, the nucleotide sequences of SEQ ID NO:X are useful for designing nucleic acid hybridization probes that will detect nucleic acid sequences contained in SEQ ID NO:X or the cDNA contained in Clone ID NO:Z. These probes will also hybridize to nucleic acid molecules in biological samples, thereby enabling

immediate applications in chromosome mapping, linkage analysis, tissue identification and/or typing, and a variety of forensic and diagnostic methods of the invention. Similarly, polypeptides identified from SEQ ID NO:Y may be used to generate antibodies which bind specifically to these polypeptides, or fragments thereof, and/or to the polypeptides encoded by the cDNA clones identified in, for example, Table 1A.

[51] Nevertheless, DNA sequences generated by sequencing reactions can contain sequencing errors. The errors exist as misidentified nucleotides, or as insertions or deletions of nucleotides in the generated DNA sequence. The erroneously inserted or deleted nucleotides cause frame shifts in the reading frames of the predicted amino acid sequence. In these cases, the predicted amino acid sequence diverges from the actual amino acid sequence, even though the generated DNA sequence may be greater than 99.9% identical to the actual DNA sequence (for example, one base insertion or deletion in an open reading frame of over 1000 bases).

[52] Accordingly, for those applications requiring precision in the nucleotide sequence or the amino acid sequence, the present invention provides not only the generated nucleotide sequence identified as SEQ ID NO:X, and a predicted translated amino acid sequence identified as SEQ ID NO:Y, but also a sample of plasmid DNA containing cDNA Clone ID NO:Z (deposited with the ATCC on October 5, 2000, and receiving ATCC designation numbers PTA 2574 and PTA 2575; deposited with the ATCC on January 5, 2001, and having depositor reference numbers TS-1, TS-2, AC-1, and AC-2; and/or as set forth, for example, in Table 1A, 6 and 7). The nucleotide sequence of each deposited clone can readily be determined by sequencing the deposited clone in accordance with known methods. Further, techniques known in the art can be used to verify the nucleotide sequences of SEQ ID NO:X.

[53] The predicted amino acid sequence can then be verified from such deposits. Moreover, the amino acid sequence of the protein encoded by a particular clone can also be directly determined by peptide sequencing or by expressing the protein in a suitable host cell containing the deposited human cDNA, collecting the protein, and determining its sequence.

#### ***RACE Protocol For Recovery of Full-Length Genes***

[54] Partial cDNA clones can be made full-length by utilizing the rapid amplification of cDNA ends (RACE) procedure described in Frohman, M.A., et al., Proc. Nat'l. Acad.

Sci. USA, 85:8998-9002 (1988). A cDNA clone missing either the 5' or 3' end can be reconstructed to include the absent base pairs extending to the translational start or stop codon, respectively. In some cases, cDNAs are missing the start codon of translation, therefor. The following briefly describes a modification of this original 5' RACE procedure. Poly A<sup>+</sup> or total RNA is reverse transcribed with Superscript II (Gibco/BRL) and an antisense or complementary primer specific to the cDNA sequence. The primer is removed from the reaction with a Microcon Concentrator (Amicon). The first-strand cDNA is then tailed with dATP and terminal deoxynucleotide transferase (Gibco/BRL). Thus, an anchor sequence is produced which is needed for PCR amplification. The second strand is synthesized from the dA-tail in PCR buffer, Taq DNA polymerase (Perkin-Elmer Cetus), an oligo-dT primer containing three adjacent restriction sites (XhoI, SalI and ClaI) at the 5' end and a primer containing just these restriction sites. This double-stranded cDNA is PCR amplified for 40 cycles with the same primers as well as a nested cDNA-specific antisense primer. The PCR products are size-separated on an ethidium bromide-agarose gel and the region of gel containing cDNA products the predicted size of missing protein-coding DNA is removed. cDNA is purified from the agarose with the Magic PCR Prep kit (Promega), restriction digested with XhoI or SalI, and ligated to a plasmid such as pBluescript SKII (Stratagene) at XhoI and EcoRV sites. This DNA is transformed into bacteria and the plasmid clones sequenced to identify the correct protein-coding inserts. Correct 5' ends are confirmed by comparing this sequence with the putatively identified homologue and overlap with the partial cDNA clone. Similar methods known in the art and/or commercial kits are used to amplify and recover 3' ends.

[55] Several quality-controlled kits are commercially available for purchase. Similar reagents and methods to those above are supplied in kit form from Gibco/BRL for both 5' and 3' RACE for recovery of full length genes. A second kit is available from Clontech which is a modification of a related technique, SLIC (single-stranded ligation to single-stranded cDNA), developed by Dumas et al., *Nucleic Acids Res.*, 19:5227-32 (1991). The major differences in procedure are that the RNA is alkaline hydrolyzed after reverse transcription and RNA ligase is used to join a restriction site-containing anchor primer to the first-strand cDNA. This obviates the necessity for the dA-tailing reaction which results in a polyT stretch that is difficult to sequence past.

[56] An alternative to generating 5' or 3' cDNA from RNA is to use cDNA library double-stranded DNA. An asymmetric PCR-amplified antisense cDNA strand is

synthesized with an antisense cDNA-specific primer and a plasmid-anchored primer. These primers are removed and a symmetric PCR reaction is performed with a nested cDNA-specific antisense primer and the plasmid-anchored primer.

### ***RNA Ligase Protocol For Generating The 5' or 3' End Sequences To Obtain Full Length Genes***

[57] Once a gene of interest is identified, several methods are available for the identification of the 5' or 3' portions of the gene which may not be present in the original cDNA plasmid. These methods include, but are not limited to, filter probing, clone enrichment using specific probes and protocols similar and identical to 5' and 3' RACE. While the full length gene may be present in the library and can be identified by probing, a useful method for generating the 5' or 3' end is to use the existing sequence information from the original cDNA to generate the missing information. A method similar to 5' RACE is available for generating the missing 5' end of a desired full-length gene. (This method was published by Fromont-Racine et al., Nucleic Acids Res., 21(7):1683-1684 (1993)). Briefly, a specific RNA oligonucleotide is ligated to the 5' ends of a population of RNA presumably containing full-length gene RNA transcript and a primer set containing a primer specific to the ligated RNA oligonucleotide and a primer specific to a known sequence of the gene of interest, is used to PCR amplify the 5' portion of the desired full length gene which may then be sequenced and used to generate the full length gene. This method starts with total RNA isolated from the desired source, poly A RNA may be used but is not a prerequisite for this procedure. The RNA preparation may then be treated with phosphatase if necessary to eliminate 5' phosphate groups on degraded or damaged RNA which may interfere with the later RNA ligase step. The phosphatase if used is then inactivated and the RNA is treated with tobacco acid pyrophosphatase in order to remove the cap structure present at the 5' ends of messenger RNAs. This reaction leaves a 5' phosphate group at the 5' end of the cap cleaved RNA which can then be ligated to an RNA oligonucleotide using T4 RNA ligase. This modified RNA preparation can then be used as a template for first strand cDNA synthesis using a gene specific oligonucleotide. The first strand synthesis - reaction can then be used as a template for PCR amplification of the desired 5' end using a primer specific to the ligated RNA oligonucleotide and a primer specific to the known sequence of the gene of interest. The resultant product is then sequenced and analyzed to confirm that the 5' end sequence belongs to the relevant gene.



[58] The present invention also relates to vectors or plasmids which include such DNA sequences, as well as the use of the DNA sequences. The material deposited with the ATCC (deposited with the ATCC on October 5, 2000, and receiving ATCC designation numbers PTA 2574 and PTA 2575; deposited with the ATCC on January 5, 2001, and receiving ATCC designation numbers TS-1, TS-2, AC-1, and AC-2; and/or as set forth, for example, in Table 1A, Table 6, or Table 7) is a mixture of cDNA clones derived from a variety of human tissue and cloned in either a plasmid vector or a phage vector, as described, for example, in Table 7. These deposits are referred to as "the deposits" herein. The tissues from which some of the clones were derived are listed in Table 7, and the vector in which the corresponding cDNA is contained is also indicated in Table 7. The deposited material includes cDNA clones corresponding to SEQ ID NO:X described, for example, in Table 1A (Clone ID NO:Z). A clone which is isolatable from the ATCC Deposits by use of a sequence listed as SEQ ID NO:X, may include the entire coding region of a human gene or in other cases such clone may include a substantial portion of the coding region of a human gene. Furthermore, although the sequence listing may in some instances list only a portion of the DNA sequence in a clone included in the ATCC Deposits, it is well within the ability of one skilled in the art to sequence the DNA included in a clone contained in the ATCC Deposits by use of a sequence (or portion thereof) described in, for example Tables 1A or 2 by procedures hereinafter further described, and others apparent to those skilled in the art.

[59] Also provided in Table 7 is the name of the vector which contains the cDNA clone. Each vector is routinely used in the art. The following additional information is provided for convenience.

[60] Vectors Lambda Zap (U.S. Patent Nos. 5,128,256 and 5,286,636), Uni-Zap XR (U.S. Patent Nos. 5,128, 256 and 5,286,636), Zap Express (U.S. Patent Nos. 5,128,256 and 5,286,636), pBluescript (pBS) (Short, J. M. et al., *Nucleic Acids Res.* 16:7583-7600 (1988); Altling-Mees, M. A. and Short, J. M., *Nucleic Acids Res.* 17:9494 (1989)) and pBK (Altling-Mees, M. A. et al., *Strategies* 5:58-61 (1992)) are commercially available from Stratagene Cloning Systems, Inc., 11011 N. Torrey Pines Road, La Jolla, CA, 92037. pBS contains an ampicillin resistance gene and pBK contains a neomycin resistance gene. Phagemid pBS may be excised from the Lambda Zap and Uni-Zap XR vectors, and phagemid pBK may be excised from the Zap Express vector. Both phagemids may be transformed into *E. coli* strain XL-1 Blue, also available from Stratagene.

[61] Vectors pSport1, pCMVSPORT 1.0, pCMVSPORT 2.0 and pCMVSPORT 3.0, were obtained from Life Technologies, Inc., P. O. Box 6009, Gaithersburg, MD 20897. All Sport vectors contain an ampicillin resistance gene and may be transformed into *E. coli* strain DH10B, also available from Life Technologies. See, for instance, Gruber, C. E., et al., *Focus* 15:59- (1993). Vector lacmid BA (Bento Soares, Columbia University, New York, NY) contains an ampicillin resistance gene and can be transformed into *E. coli* strain XL-1 Blue. Vector pCR<sup>®</sup>2.1, which is available from Invitrogen, 1600 Faraday Avenue, Carlsbad, CA 92008, contains an ampicillin resistance gene and may be transformed into *E. coli* strain DH10B, available from Life Technologies. See, for instance, Clark, J. M., *Nuc. Acids Res.* 16:9677-9686 (1988) and Mead, D. et al., *Bio/Technology* 9: (1991).

[62] The present invention also relates to the genes corresponding to SEQ ID NO:X, SEQ ID NO:Y, and/or the deposited clone (Clone ID NO:Z). The corresponding gene can be isolated in accordance with known methods using the sequence information disclosed herein. Such methods include preparing probes or primers from the disclosed sequence and identifying or amplifying the corresponding gene from appropriate sources of genomic material.

[63] Also provided in the present invention are allelic variants, orthologs, and/or species homologs. Procedures known in the art can be used to obtain full-length genes, allelic variants, splice variants, full-length coding portions, orthologs, and/or species homologs of genes corresponding to SEQ ID NO:X or the complement thereof, polypeptides encoded by genes corresponding to SEQ ID NO:X or the complement thereof, and/or the cDNA contained in Clone ID NO:Z, using information from the sequences disclosed herein or the clones deposited with the ATCC. For example, allelic variants and/or species homologs may be isolated and identified by making suitable probes or primers from the sequences provided herein and screening a suitable nucleic acid source for allelic variants and/or the desired homologue.

[64] The polypeptides of the invention can be prepared in any suitable manner. Such polypeptides include isolated naturally occurring polypeptides, recombinantly produced polypeptides, synthetically produced polypeptides, or polypeptides produced by a combination of these methods. Means for preparing such polypeptides are well understood in the art.

[65] The polypeptides may be in the form of the secreted protein, including the mature form, or may be a part of a larger protein, such as a fusion protein (see below). It is often

advantageous to include an additional amino acid sequence which contains secretory or leader sequences, pro-sequences, sequences which aid in purification, such as multiple histidine residues, or an additional sequence for stability during recombinant production.

[66] The polypeptides of the present invention are preferably provided in an isolated form, and preferably are substantially purified. A recombinantly produced version of a polypeptide, including the secreted polypeptide, can be substantially purified using techniques described herein or otherwise known in the art, such as, for example, by the one-step method described in Smith and Johnson, *Gene* 67:31-40 (1988). Polypeptides of the invention also can be purified from natural, synthetic or recombinant sources using techniques described herein or otherwise known in the art, such as, for example, antibodies of the invention raised against the polypeptides of the present invention in methods which are well known in the art.

[67] The present invention provides a polynucleotide comprising, or alternatively consisting of, the nucleic acid sequence of SEQ ID NO:X, and/or the cDNA sequence contained in Clone ID NO:Z. The present invention also provides a polypeptide comprising, or alternatively, consisting of, the polypeptide sequence of SEQ ID NO:Y, a polypeptide encoded by SEQ ID NO:X or a complement thereof, a polypeptide encoded by the cDNA contained in Clone ID NO:Z, and/or the polypeptide sequence encoded by a nucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B. Polynucleotides encoding a polypeptide comprising, or alternatively consisting of the polypeptide sequence of SEQ ID NO:Y, a polypeptide encoded by SEQ ID NO:X, a polypeptide encoded by the cDNA contained in Clone ID NO:Z, and/or a polypeptide sequence encoded by a nucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B are also encompassed by the invention. The present invention further encompasses a polynucleotide comprising, or alternatively consisting of, the complement of the nucleic acid sequence of SEQ ID NO:X, a nucleic acid sequence encoding a polypeptide encoded by the complement of the nucleic acid sequence of SEQ ID NO:X, and/or the cDNA contained in Clone ID NO:Z.

[68] Moreover, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in Table 1B column 6, or any combination thereof. Additional, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in Table 1B column 6, or any

combination thereof. In further embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides and polypeptides are also encompassed by the invention.

[69] Further, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1), or any combination thereof. Additional, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1), or any combination thereof. In further embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1) and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1) and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated

in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1) and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides and polypeptides are also encompassed by the invention.

[70] Further, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2), or any combination thereof. Additional, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2), or any combination thereof. In further embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2) and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2) and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2) and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (See Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides and polypeptides are also encompassed by the invention.

[71] Moreover, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in the same row of Table 1B column 6, or any combination thereof. Additional, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in the same row of Table 1B column 6, or any combination thereof. In preferred embodiments, the polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in the same row of Table 1B column 6, wherein sequentially delineated sequences in the table (i.e. corresponding to those exons located closest to each other) are directly contiguous in a 5' to 3' orientation. In further embodiments, above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in the same row of Table 1B, column 6, and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in the same row of Table 1B, column 6, and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in the same row of Table 1B, column 6, and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[72] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in column 6 of Table 1B, and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1B, column 2) or fragments or variants thereof. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[73] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1), and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1A or 1B) or fragments or variants thereof. In preferred embodiments, the delineated sequence(s) and polynucleotide sequence of SEQ ID NO:X correspond to the same Clone ID NO:Z. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[74] In further specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in the same row of column 6 of Table 1B, and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1A or 1B) or fragments or variants thereof. In preferred embodiments, the delineated sequence(s) and polynucleotide sequence of SEQ ID NO:X correspond to the same row of column 6 of Table 1B. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[75] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of the sequence of SEQ ID NO:X are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[76] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of a fragment or variant of the sequence of SEQ ID NO:X are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent

hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[77] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of the sequence of SEQ ID NO:X and the 5' 10 polynucleotides of the sequence of one of the sequences delineated in column 6 of Table 1B are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[78] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of a fragment or variant of the sequence of SEQ ID NO:X and the 5' 10 polynucleotides of the sequence of one of the sequences delineated in column 6 of Table 1B are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides, are also encompassed by the invention.

[79] In further specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of another sequence in column 6 are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization



conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[80] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of another sequence in column 6 corresponding to the same Clone ID NO:Z (see Table 1B, column 1) are directly contiguous. Nucleic acids which hybridize to the complement of these 20 lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[81] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of one sequence in column 6 corresponding to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2) are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[82] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of another sequence in column 6 corresponding to the same row are directly contiguous. In preferred embodiments, the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B is directly contiguous with the 5' 10 polynucleotides of the next

sequential exon delineated in Table 1B, column 6. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[83] Many polynucleotide sequences, such as EST sequences, are publicly available and accessible through sequence databases and may have been publicly available prior to conception of the present invention. Preferably, such related polynucleotides are specifically excluded from the scope of the present invention. Accordingly, for each contig sequence (SEQ ID NO:X) listed in the fourth column of Table 1A, preferably excluded are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 and the final nucleotide minus 15 of SEQ ID NO:X, b is an integer of 15 to the final nucleotide of SEQ ID NO:X, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:X, and where b is greater than or equal to a + 14. More specifically, preferably excluded are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a and b are integers as defined in columns 4 and 5, respectively, of Table 3. In specific embodiments, the polynucleotides of the invention do not consist of at least one, two, three, four, five, ten, or more of the specific polynucleotide sequences referenced by the Genbank Accession No. as disclosed in column 6 of Table 3 (including for example, published sequence in connection with a particular BAC clone). In further embodiments, preferably excluded from the invention are the specific polynucleotide sequence(s) contained in the clones corresponding to at least one, two, three, four, five, ten, or more of the available material having the accession numbers identified in the sixth column of this Table (including for example, the actual sequence contained in an identified BAC clone). In no way is this listing meant to encompass all of the sequences which may be excluded by the general formula, it is just a representative example. All references available through these accessions are hereby incorporated by reference in their entirety.

**TABLE 3**

Clone ID NO: Z	SEQ ID NO: X	Contig ID:	EST Disclaimer Range of a      Range of b		Accession #'s
HTPAD46	11	1048901	1 - 1561	15 - 1575	AW026547, AL119230, AI992054, AI968455, AW193784, AW193801, AA386091, AA386130, AI825443, AA004475, and Z79235.
HCWFF88	12	1092566	1 - 639	15 - 653	
HSSAX53	13	1198889	1 - 348	15 - 362	
HCEPH71	14	522739	1 - 432	15 - 446	AA326209, AA383931, AL365319, and AL390715.
HTEDF74	15	1083405	1 - 1265	15 - 1279	AI948732, AW023798, AA058811, AA148838, C01936, and AA663155.
HTTEK47	16	1134534	1 - 1221	15 - 1235	AI651805, AI989837, AI718022, AA400005, AI458374, AA401437, AW205244, AA883445, AI478808, AW134723, AI689951, AI269389, AA865056, AI640798, H11911, R44433, AI688852, AI183700, AA424180, AI277599, R46805, and AA771819.
HTOBE75	17	1163883	1 - 1797	15 - 1811	AW192827, AA595431, AI251121, AI923335, AI284016, H30141, T70540, T90549, AI432106, AA953436, H27466, R50714, R50249, AI540363, T70809, AI659868, AW370667, Z99572, I36305, AL022146, M87861, M72332, M60235, L39075, M60230, M60228, M60231, M60229, M60232, M60227, and M60234.
HCFAT05	18	1156310	1 - 2145	15 - 2159	AL133816, AA811374, AI095381, M38217, M55515, L23499, M85217, X16001, M30312, M31744, AR050270, U38240, U38182, U96110, and U45979.
HFIAH37	19	1189001	1 - 1712	15 - 1726	AL134903, AI912243, AA976922, AI742663, AW028771, AW043595, AA478697, AA837145, W49831, AI354405, AA412384, AA602982, N62994, AA013476, AI674206, AA115419, AI377356, AW270325, AI479159, AA169423, AA133086, AA326624, H83962, R76363, AA587840, AI224540, H67227, H81547, AA665443, AA018206, AA662495, AW298791, AA251488, AA301274, AA132987, AI192416, AI300307, AA722928, AA478563, R76688, AA579347, AA501519, AA629042, AI299974, H70300, AI865166, AA252018, N79902, AI867958, AI300195, AA251195, AA251787, H65133, AW246148, AA644296, AA115418, AC004381, and AF227510.
HFTDF15	20	1084887	1 - 715	15 - 729	AA837715, AI623899, AA775049, AA317045, AA581914, AA679872, T03203, AA780929, AI634323, AA604843, AA904275, AW440633, AA362395,

					AA468486, AI582890, AA640979, AL046746, AA721615, H67866, AA632960, AI561116, AL120976, AI978792, AA663306, AF034193, AW302293, AF108083, AC005486, AL109985, AC007229, U47924, AC008249, AL031289, AC004031, AC003029, AC005899, AL022721, AC003982, Z97053, AC004134, AC004883, AC005839, AC003670, AC005746, AP000018, AL135744, AC005037, AL021808, Z95889, AC006071, AC005480, AC004815, AP000159, AC007551, AL031670, AC000117, I59642, AC005346, L39891, AF039906, AC008372, AL034420, AL078611, AC007055, AF134726, AL049643, AL121769, AL031447, AC003038, AL096701, AL031257, AL035690, AL050318, AL035681, AL049745, AL031589, AC005412, AC007792, AL049636, AL008583, AL021878, AL049569, AC007536, AF165926, AC005234, AL022237, AL031848, AL022149, AC004990, AC006501, AL023553, AC007363, AC005696, AL035455, AC006120, AL031282, AL050309, AC016830, AC005881, AC005529, AC004929, AC006459, AC007308, AC002319, AC002477, AL031277, AC003669, AC002470, AF196969, Z82215, AC006039, AL049780, AC006578, AF111168, AF207550, AF064864, AF165176, AL033521, AC004821, AC003663, AC004655, AF205588, AL096757, AC002429, AC005527, AL034402, AL031775, AC002077, AC009498, AC006006, AJ011930, AC005082, AL031650, AC005695, AL109627, AC000003, AC005264, AC007934, AC005086, Z83838, AC005777, AL133304, Z97630, AC003101, AC004034, AC004672, AL022320, AP000475, AC004905, Z98052, AL078581, AC004517, AL021997, AC006139, AC005996, AC005380, AC002395, AC006023, Z82244, AL034423, AF001550, AL031685, AL008723, AC005102, AC007199, AC007151, AC003043, AF037222, AL008710, AC007193, AC005081, AC004921, AL022329, AC005520, AC005039, AL035587, Z98051, AC020663, AC016027, AC006211, AC003104, Z69921, AL133246, AC005049, AL049869, AC002091, AC005225, and AL033504. AC005344.
HPFCU80	21	1017593	1 - 328	15 - 342	

HSVAW49	22	1153916	1 - 991	15 - 1005	AF146277, U95740, AL008731, AC002551, and AL079342.
HWHQC94	23	1116463	1 - 904	15 - 918	AI366191, AC004472, AC005259, and AW469987.
HRSMD49	24	1065458	1 - 442	15 - 456	AA136820.
HFTDY67	25	1151220	1 - 1523	15 - 1537	AI335266, AI751901, AI751815, AI750604, AI040116, AW067945, AW239149, AI572373, N42174, N22119, N71503, AF182316, AF182317, AB033033, AR018882, and AB026436.
HYABL89	26	1090733	1 - 700	15 - 714	
HCUEV29	27	1137791	1 - 703	15 - 717	AI570209, AA583494, AW337550, AW087991, AI027766, H17041, AW410192, AI669151, T30350, AA335428, C16961, AA878169, AW411072, AW410900, T24722, AA365566, AA365567, AI418046, AA350018, AW246233, and AL031283.
HCESP56	28	1121751	1 - 506	15 - 520	AW247740, AW247029, AW204207, W39269, AA325536, R14422, W52568, Y16752, AL022170, and Z65186.
HLQDT35	29	1154064	1 - 1308	15 - 1322	AI659435, AW006450, AI380742, AI953510, AI078578, AA707183, AI453381, AI445431, AW136858, AA807157, AW196880, AA131680, AI569636, AI140912, AA530976, AA410746, AA134742, AA152440, AA807317, AA283695, N66180, AI082380, AI269183, AA480063, AA635830, AA433870, AI631995, AI167742, AA292134, AA131985, AA923686, AI580936, N30879, AI358691, AA631878, AA485099, AA485100, AA165214, AA253107, H92198, AI160395, AA830846, AI753274, AA253052, AA152441, AA879095, R08557, R11497, AA358765, AA706241, AA134743, AI424722, AI800536, R08654, R10421, N99172, T89988, AA804424, W16996, AI934059, AA481922, AA292133, AA746933, N56752, AA290907, AI091625, and AL137699.
HDPBS64	30	846624	1 - 743	15 - 757	AA888874, AA992389, and AI767840.
HTBAB41	31	1052388	1 - 785	15 - 799	AA382198, H48825, H58945, and AI359780.
HTLGE31	32	870247	1 - 519	15 - 533	AA714179, AW051497, AI971919, AI094911, AW055123, AA293722, AI094408, and AA631985.
HWLHK29	33	1152279	1 - 941	15 - 955	AA243837, AA588755, AW137873, AI351894, AA360896, AI903764, R33743, AL045500, AL039086, AL036802, AL046849, AI906328, AL042628, AW129106, AL036638, AL119791, AI312428, AL036396, AW163554, AL041562, AI690887, AL079963, AL036631, AL037463, AL135661, AI581033, AW020397, AW022682, AL134598, AW238730, AW105601,

				AI349772, AW023338, AI349937, AI623941, AI537677, AA225339, AA470491, AW059828, AW020419, AL110306, AI279925, AI929108, AI580290, AI624859, AI538885, AI207510, AW268253, AL042166, AI312152, AL046944, AI613038, AI446373, AI590423, AA572758, AL041016, AI678446, AL042544, N29277, AL042382, AI340519, AI340603, AI580190, AI345111, AI907070, AL119748, AW044029, AI866691, AA640779, AL041150, AI433157, AI281867, AA641818, AI886594, AI345347, AI366974, AW162194, AI345415, AI473451, AI348897, AW020710, AI539800, AW149876, AI624943, AI251221, AI349933, AA420722, AI923989, AI284517, AA580663, AI500061, AI628325, AL135025, AW021717, AI868204, AI440263, AI699143, AI247193, AW051059, AI345735, AL042745, AL037454, AI344910, AI863014, AL047344, AW020693, AI538637, AI433976, AL121328, AW074869, AW189301, AW162189, AI801793, AI244249, AI064830, AL047042, AI445430, AW020460, AI357599, AI349256, AW021140, AI277008, AW022861, AW068845, AI698391, AI687568, AI815232, AW050578, AW023859, AI149592, AI307708, AL046931, AI680498, AA579232, AA635382, AL119399, AI340627, AW167918, AI349645, AW089572, AL120307, AL040241, AI690946, AW150578, AW151136, AI953765, AW403717, AI559752, AL121270, AI436429, AI590043, AI452857, AI798456, N57346, AI802542, AL042191, AA806719, AI567582, AI540674, AL038575, AL043070, AL040694, AA494167, AI916419, AW058233, AI573026, AI471227, AL118781, AI920968, AI589668, AI345612, AI345688, AW082532, F37439, AI610362, AL120736, AL036664, AL043168, AL119836, AI866465, AW074993, AW268072, AL043345, AI554343, AW191003, AL038605, AI866608, AI345608, AW268261, AI471898, AL036240, AW021373, AW020561, AL041772, AI114703, AI475371, AI582912, AL036736, AA693314, AI554821, AI287446, AI307569, AI345253, AA848053, AL048323, AA613907, AI345416, AW268067,
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HHEGG20	34	1106816	1 - 958	15 - 972	AF084205, and AW473942.
HDPRU43	35	1217035	1 - 2939	15 - 2953	AI912020, AI738591, AI673200, AW195629, AI914327, AW207103, AI858984, AI016102, AI948562, AI021976, AA515654, AA824295, AI288261, AW003109, AA029227, AI332790, AI863407, AW271426, AA447206, AW197033, AI673222, AA846300, AI093417, AW274813, AA917651, AI989749, AI198249, AI933079, AW337461, AA149282, AA476264, AA029228, N89854, AI650694, Z28929, AA149376, R53155, AA805734, AI862408, AW374891, AA010232, AW137892, AW250017, AA077657, H43959, AA077229, AI400383, AA077669, AI971136, AA076731, AW405369, AI862409, AW386712, AW386708, R49809, R43152, H22270, AA077893, AA889934, F00253, AF139794, M91506, AA077980, AI282751, AA077825, AA010157, F01048, AW393714, AA078429, AA077544, AI768799, AA076983, AA076893, AI125178, AW205906, AW373785, AI963990, AB011110, AC004084, and AC004985.
HE8PK12	36	1227647	1 - 3678	15 - 3692	AI675352, AA404223, N21458, AW377007, AW055240, AW376965, W72194, AI744480, AW377009, AA460033, AA689223, AI151138, AW367398, AI204462, AW367559, AI814765, AA514481, AA514486, AL041934, AI378530, AI127602, AI805975, AI816548, AA459944, AI079813, H99690, N69075, AI220492,



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HE9HV92	37	1227519	1 - 3422	15 - 3436	AW451462, AW389371, AA469982, AW389370, AW389367, AI625782, N62808, AW389369, AW367986, AW389368, AW389596, AW389606, AW044368, AA679038, AI493173, AW083020, AI280052, AI634922, AA402837, AW377678, AW389366, N33240, AI805314, AW004651, AI141651, N93923, AI000968, AF114067, AI922980, AA910867, AA918883, AW389616, H98243, H29386, H29296, H98939, AW367988, AW028291, F11743, AW002598, AI143427, AI679840, AA709068, AA402687, AA927333, AI183648, W01827, AW367982, Z45487, F06551, T65373, AW367985, AW389594, AW367974, AI679265, AW367968, AI569013, N79690, AA412251, N70773, AA994823, AI588847, AW377594, AA886715, AW139939, Z39513, F04059, F09403, F04352, AA348028, AI700831, R12190, AW139934, AI275660, AI253408, AI423822, R35809, AW389634, AW389639, Z45167, AW295763, AW389633, AW389637, R39914, AW389632, AA336725, T65450, AW389643, N41955, M78477, AW389640, AW389626, N56035, AW083017, AA343776, AW389615, AW389623, AW389628, AI802303, AW389641, AW389630, AW389359, AW389354, AA961766, AB007860, I74314, I74317, AF069506, AW627522, and AW630555.
HOHCE47	38	1217059	1 - 2131	15 - 2145	AI902550, AA852921, AW449324, and

					AB018324.
HSDII69	39	1154067	1 - 1418	15 - 1432	AA203346, AA203330, AI024792, AI383978, AA489694, AA658936, AI912487, AA640288, AW022618, AA115749, AA669824, AW296909, AW024848, AA133454, AA552781, AI332862, T86475, AI332863, AA665267, AA640358, AI625278, AA878769, T31809, AA318980, T86474, Z24863, and AL049423.
HKAKM10	40	1227639	1 - 3921	15 - 3935	AW166113, AI762270, AI761800, AI968494, AI935006, AI393355, AA885443, AA847857, AW044423, AI188200, AW085175, T66118, AI935038, AW003121, AI356390, AA588552, AI475498, AI139170, N63644, AW450561, AW088729, R70631, AI203354, AI239443, W45495, AA654175, H95337, AI002826, AA578373, F10209, AI468683, F09647, T83850, AA317152, T65033, AA641861, AW196381, AI350190, F12591, AI383380, W40418, F12002, T74348, W23298, R70529, T89046, N80491, AI474886, R88730, AB014530, AF071070, AF170304, AF077658, AF170303, and AF071071.
HCEPU56	41	1226120	1 - 2754	15 - 2768	AL134903, AW043595, AI912243, AA602982, AI674206, AA976922, AI224540, AA662495, AI742663, AW028771, AA478697, AA837145, AI354405, W49831, AA132987, AA412384, N62994, AI300307, AA013476, AA115419, AA722928, AI377356, AA478563, AW270325, AI479159, R76688, AA579347, Z43536, AA629042, AA169423, AA326624, H83962, AA133086, R76363, AA665443, AA587840, H67227, H81547, AA018206, AW298791, AA251488, AA301274, AI300195, AI192416, AI867958, AA501519, AI299974, H70300, AA644296, AI865166, AA252018, N79902, AA251195, AA251787, H65133, T26917, N83883, T26928, AL045327, AL045328, AL134524, AL134110, AL038878, AL047163, AW246148, AL042898, U46344, AI318479, AL037295, AL038838, AL048677, AL037343, AL038651, AI547295, AL038983, AI142134, D29033, AL037436, AL037335, AL037323, AL135012, AL037727, AL037443, AL038532, AL038822, AL038761, AL037435, AL040472, AL043941, AL039432, AL045494, AL044125, AL043923, AL043814, AL047012, AL041238, AL044186, AL040617, AL043845, AL041347, AL038024, AL040576, AL040193, AL045753, AL042523, AL041955, AL040463,

					AL047170, AL048657, AL044037, AL041635, AL040294, AL044064, AL041459, AL041577, AL044162, AL040464, AL047219, AL040625, AL045684, AL041752, AL046850, AL040768, AL045671, AL046994, AL048714, AL046914, AL045891, AL039360, AL038745, AL040052, AL043496, AL040444, AL043538, AL040621, AL040510, AL043467, AL043677, AL040839, AL043492, AL041602, AL044074, AL041730, AL041523, AL043627, AL041374, AL043848, AL043570, AL047183, AL042135, AL042655, AL046442, AL041324, AA115418, AL041133, AL039643, AL039316, AL041098, AL040322, AL046392, AL043089, AL040119, AL044272, AL044258, AL042420, AL037341, AL042468, AL038040, AL041096, AL042096, AL045817, AL041168, AL049018, AL079852, AL043321, AL041163, AL041159, AW363350, AL045920, AL040148, AL042741, AL047057, AL038041, AL040458, AL044187, AL046356, AF227510, AC004381, AR066494, AJ238010, A93923, A93916, D17247, A93931, AR064707, AL133053, AL122101, A85203, AR023813, AW611706, and AW769812.
HUSHB54	42	928054	1 - 343	15 - 357	AA348022.
HLMD095	43	928344	1 - 469	15 - 483	AC020641.
HHASQ32	44	1198902	1 - 880	15 - 894	H00195, AI251764, AL042753, AW117882, AI349772, AL047763, AL121270, AI868831, AI433976, AW162071, AL047042, AI064830, AI436456, AI815383, AI433157, AL135661, AL036146, AI500077, AL119791, AL036396, AW268253, AL045500, AL046849, AA640779, AI349645, AI500553, AL036802, AW071349, AI687376, AI679724, AL119049, AI568870, AI863014, AI608667, AI690751, AI702406, AA613907, AW303152, AL121365, AI567351, AI349933, AI920968, AW238730, AI207510, AI873731, AL040169, AI687728, AI538716, AI469532, AI580190, AL036759, AI567632, AL119748, AW103371, AI673256, AL120854, AI934036, AI969601, AW166645, AI340582, AW080838, AW089572, AI907070, AI687415, AI521012, AI440426, AI906328, AW074993, AL036980, AI499393, AI349256, AI312152, AI753683, AW274192, AI969567,

				AI349937, AW302965, AI349614, AI349004, AI349598, AL038605, AI889203, AA585422, AI251485, AI343112, AL036274, AI343059, AL120736, AL036240, AI818683, AW132121, AW301409, AI282655, AA572758, AI609592, AI678302, AW235035, AI285735, AI250293, AI799305, AI309401, AI631107, AW195957, AI366549, AI281779, AW071417, AI149592, AI583316, AI690835, AI340519, AI345860, AI909666, AI686926, AI345744, AI475371, AI345735, AW087445, AI696846, AI498579, AI439087, AI497733, AI636456, AI813914, AI307466, AI366991, AI682743, AI907061, AI866608, AI275175, AI597918, AI635461, AI345111, AI909662, AW169653, AI635942, AI624859, AI671679, AA528491, AW068845, AI564719, AI699857, AI560012, AI568854, AI620284, AI220734, AA938383, AI446606, AI312428, AI590128, AL040243, AI445432, AI625079, AA528822, AI697137, AI857296, AI919058, AI540832, AI613017, AI249257, AI702433, AW148320, AI800453, AI800433, AI609580, AI866780, AI499463, AL038778, AI610307, AI758437, AI597750, AI633419, AI866002, AI684265, AA603930, AL043326, AW074869, AI224992, AL048871, AI687362, AI434281, AI281773, AI680113, AI344182, AI952114, AI874109, AI862142, AI440239, AI271786, AI499131, AL038779, AI682841, AI269696, AI307558, AL042538, AL036247, AI348897, AI475134, AI610645, AI682106, AI889839, AI866887, AW301300, AI628205, AI800411, AI539771, AI500659, AI469811, AI754897, AI064787, AI569616, AI281762, AI624668, AI580984, AA508692, AA528529, AI570384, AW075351, AW167776, AI802542, AW026882, AL036260, AI907056, AL047041, AI921379, AI610756, AI886532, AI818206, AI811863, AI334902, AI492540, AI445025, AL044207, AI636445, AW104724, AI439745, AW002342, AI888953, AI687375, AI282281, AI620868, AL036361, AI493248, AI340603, AW085799, AI349226, AW118557, AI804585, AI609331, AW268768,
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HARAB87	45	1164340	1 - 536	15 - 550	AI733761, AA121199, AA296916, AI770025, AI733898, AA366952, AA149362, AI288862, AC005669, S76742, I26666, and AF075261.
HTNGF69	46	1152268	1 - 824	15 - 838	AI139022, AA552953, AI204346, AI741884, AI042245, AW205544, AI017548, AA258321, AI571085, AA478401, AA258530, AA701456, AA454012, AA402279, AA873796, Z41600, AA688162, AI799203, and

HMSJL96	47	1154788	1 - 1898	15 - 1912	C00673. U69566, AI478738, AI700975, AW270625, AA558431, AI955662, AI796542, AA620937, AW073767, AA928103, AI087266, AI949116, AI273460, AI766325, AW297573, AA873139, AI350929, AA770419, AA954532, N64139, R75698, N87915, R01072, H26525, R01798, AA773665, AI003807, AA318420, and AA318524.
HDTBT06	48	1205261	1 - 1434	15 - 1448	AA443164, AW020571, AA532437, AW118680, AI890631, AI167234, AA744921, AI401545, AW152040, AW074628, H06431, R74385, AA862392, AA649701, AA160546, AI880570, D62917, H23246, H46816, AA973615, AI819867, H00507, R21742, AA463453, C05953, R25958, R26764, AA639080, AW195349, AA315526, AW362722, AI494615, AW070869, H71752, T84284, AA767232, AI824357, and AF161399.
HTTIE47	49	1165363	1 - 878	15 - 892	R29204, W60551, and AC004386.
HHFBP47	50	946668	1 - 1193	15 - 1207	AW341717, AA001259, AA778598, AA203115, AI632467, AA707336, H69425, H68732, AI992354, AA346824, AI541205, AI557731, AI525500, AI557533, AI525556, AI557262, AI541321, AI557082, H65400, AI557238, AI557602, T18597, AI540890, AW021281, AI541056, AI557258, AI541048, AI525856, AI557084, AI535660, AI525656, D50992, Z32887, AW021585, AI526078, Z33559, AI557234, D59751, AI535639, AW023235, AI525757, AW022727, AL050350, AC002464, AR050070, S68736, A62298, A82595, A82593, Z30183, U94592, Y08991, A62300, AF006072, U45328, and AR025466.
HCCCC81	51	1083553	1 - 710	15 - 724	W16450, AL042537, AA367722, AI436552, and AA236375.
HPJEV71	52	1197841	1 - 1830	15 - 1844	AW239092, AA174017, AA303007, AL038072, AW103758, AI923333, AA576336, AA704393, AI654285, AI859946, AI888468, AA837778, AI254913, AW089101, AA584145, AA468131, F08230, AA302973, AA847952, AI620992, AI923126, AI800168, AI278972, AI207465, AW023149, H06140, AI751216, AI800180, AW131208, AI824706, AW440545, AP001037, AC006211, AL080243, AL121892, AP000525, AC006480, AC006288, AL031321, AL008731, AC004466, AC005870, AC008134, AC000353, AL117352, AC003049, AC007227, AF008191, AC004836, AC005041, AC005209, Z98941, AL049690, AC005952, AC007216,

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HTEIL07	53	1136121	1 - 1216	15 - 1230	AA725842, AW139921, AI651885, AI971598, AA453466, AL110422, AI027229, AI026797, AA778573, AI279962, AI073425, AI208767, H55405, AA453966, H55431, AL118498, and AL031843.
HTEAG49	54	954614	1 - 1289	15 - 1303	AW452652, AI039005, AA780077, AW316890, AI337290, AA463229, AA463230, AI423317, AI468158, AA382497, N66986, AF041822, AL390796, AL390796, AL357045, and AL357045.
HSLCF96	55	637670	1 - 1575	15 - 1589	
HNHCI32	56	861673	1 - 586	15 - 600	AF112462, and AR035954.
HPMFL08	57	1050684	1 - 463	15 - 477	AA555286, AA640814, AI281916, AW073979, AI378363, R70468, AW242350, AW013856, AA644290, AW449140, Z93016, AC012384, AL035541, AC005228, AC003662, and AC009300.
HTXRA13	58	959622	1 - 1150	15 - 1164	AI701008, N92159, AA363885, AI990716, AW197467, and AW291923.
HCE3H71	59	1197898	1 - 2059	15 - 2073	AI638508, AW139057, AW149807, AI654790, AI419465, AI569283, H51217, R90888, R85125, H29245, H29244, AA488106, AI480182, H05353, AI500178, AI873131, AI499775, F11386, H05303,

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HUTSF11	60	1134914	1 - 437	15 - 451	AI384010, AI288640, Z20435, and A74523.
HTEGI48	61	1021235	1 - 536	15 - 550	AA102044, H93506, AF140360, and AF074606.
HSFAM09	62	1153913	1 - 281	15 - 295	
HNFHK77	63	1182286	1 - 1272	15 - 1286	
HFXDO83	64	1012602	1 - 605	15 - 619	T03269, D58283, D59859, D80022, D80166, D80195, D80193, D59927, D59467, D51423, D59619, D80210, D51799, D80391, D80164, D59275, D80240, D80253, D80043, D59787, D80227, D59502, C14331, D80038, AW177440, AW378532, AW179328, AA305409, D80134, C14389, D51097, C75259, AW360811, AW366296, AW375405, D58253, AA305578, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, D80132, AW352170, AW377676, AW178906, AW177733, AA033512, D89785, D34614, X67155, X82626, A84916, A67220, A62300, A62298, Y17188, A78862, D26022, D88547, AJ132110, A25909, AR018138, AB012117, AR025207, A85396, A44171, A85477, AR066482, A86792, I19525, X93549, AF058696, Y12724, AR008278, AB028859, D88507, A94995, AF135125, U87250, I18367, U87247, AB033111, and AR064240.
HSDIW73	65	1104406	1 - 1602	15 - 1616	
HFVGD23	66	1199645	1 - 1842	15 - 1856	W78862, W19697, H14921, AA576940, H14628, H54580, AW119184, T93838, AA056294, R53170, R99389, R11968, F11919, F11380, T79980, AA043550,

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HMSBZ24	67	1082367	1 - 706	15 - 720	H14236.
HWHHB69	68	1217042	1 - 2892	15 - 2906	AL045925, AL042685, AW245943, AW245500, AI827711, AW247149, AI589761, AI422317, AI076031, N94372, AA708691, AA702609, AA702730, AI912816, AI984055, AL042686, AI420887, AL045926, AW272712, AW237553, AI469477, AA494501, AW374634, AI863106, AA181277, T15903, AI476561, R06007, AA380280, AA322751, C04187, F36452, AW248180, AA883148, AI767541, T82100, AA506918, AA227226, C01255, N57562, and AJ242655.
HFXLC69	69	1162543	1 - 1632	15 - 1646	AA296887, AA297110, AF065216, AF121908, and AF065215.
HBXBW40	70	1156765	1 - 574	15 - 588	AL023754, AL049688, and D86557.
HCEIL51	71	1140498	1 - 420	15 - 434	AA349751.
HRADM45	72	1148046	1 - 468	15 - 482	AA418916, AA426580, AJ271722, AP000260, AP000036, AF055919, AP000099, and AP000098.
HTEFO45	73	1153918	1 - 899	15 - 913	AA620907, AA758187, AA015938, R84831, AA412093, R58215, and U75361.
HOHBN82	74	1152271	1 - 1453	15 - 1467	AI335266, AI751901, AI751815, AI750604, AI040116, AW067945, AW239149, AI572373, N42174, N22119, N71503, AF182316, AF182317, AB033033, and AR018882.
HWHGF52	75	1217026	1 - 2228	15 - 2242	AW044636, AI216076, AA846742, W22035, AW172841, AI291112, AI681233, AW080046, AI399893, H28922, AA614450, AA536156, AI278855, N39741, AI183847, H21177, AA313439, N20038, AA470881, AI088477, AA032036, AW007815, AA515917, AA348553, R86198, AW006990, AI094006, D61068, AI282605, R48136, AA971399, AA333772, AA365066, N26782, AA034263, AA377509, AA804676, AI242834, R48135, AA576728, D60948, D60442, H46369, R49863, D81590, AI183862, AA894892, AA886813, D53429, AA484583, R49862, AA907007, AA339653, AI183749, AA348552, AI167561, AI869376, AA223889, M78928, AI241882, AB002360, and Z35654.
HBKDI30	76	1223861	1 - 1626	15 - 1640	F37398, AA197072, F22840, AW444680, AA196995, F31270, R02824, F37397, AA112849, F17211, F37676, F30884, F35768, F35763, J05194, and J03886.
HSQFR54	77	1185143	1 - 2012	15 - 2026	AA811369, AA873372, AA209183, AA304836, W26880, AW189673,

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HAGBA56	78	1102593	1 - 1273	15 - 1287	AA812064, AI803142, AA430303, AA430200, AI425013, AA954361, AA012835, T07365, AA984341, AI207984, AB020641, AF033655, U62391, AC000057, AC006036, and AC002458.
HHSAE29	79	1220851	1 - 1193	15 - 1207	
HMSHO64	80	746582	1 - 398	15 - 412	
HFPBW22	81	1154786	1 - 1051	15 - 1065	AA583561, AI685755, and AI971263.
HTLBH67	82	1224371	1 - 2872	15 - 2886	AI700778, AI651596, AA203283, AI079116, AI269328, AA766256, AA846207, W94671, W95139, AI765522, AI123765, AW337193, AI693824, T15539, AI269741, W19592, AW449541, AW407143, AA045079, AI204381, AA045395, AW305104, AI742830, AW052085, AI858504, AI587476, AW135172, AI887064, AW380082, AW295490, AI453541, AI955603, AA971802, AA485799, AA287153, AI761438, AA485669, AA781274, AA214554, AI865011, AA284733, AW341388, AA814271, AA447822, AA256234, AA368228, AC005368, AF086518, and AF059650.
HNTMH70	83	1143523	1 - 1073	15 - 1087	AL045099, AL110384, AA477597, AA485587, R25821, AL134410, R55476, AA584162, H19102, AI383263, AA349309, H42360, AA953198, AI688425, W22471, AI537054, AA736967, R56322, AA526482, H29361, AI699883, F06802, Z78292, AA081493, AW168512, AA035215, AA078393, AA077854, H21589, AI004027, AA836778, D44975, AA581900, R17223, H18689, AA507183, AI570959, AL134844, R87452, AA569527, AA491053, AA077436, R28228, R49752, F00981, W38765, AA584770, AA601420, AA374571, R87607, AA601480, AA310271, R26668, R11721, AW298136, AA780824, F12062, AA164247, AA062928, AI539135, AI752143, T66331, AA868891, AI298079, AA582543, AC005726, AC005785, AF196970, AL034374, AL049822, Y18000, AC005529, AC005288, AC002553, AC002395, AF052041, AP000087, AL049594, AC015853, AC007999, AL049839, AC005531, AC008038, AF095725, AC002351, AL034394, AC005694, AC004860, AC005343, Z98304, AL031650, AL109847, AL021938, AP000225, AC002524, AC007372, AL050321, AP000555, AC005829, AC003663, AL035681, AP000350, AL049837, AL118497, AC005013, Z98742, AL031685, AC003991, AC006449,

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HCETC59	84	1183334	1 - 401	15 - 415	AA346622, AA085022, and U35245.
HE8UX76	85	1161223	1 - 1763	15 - 1777	AI863338, AA703679, AI223268, F12220, F09849, R22646, H04918, H04815, T66347, AB026810, AB026803, AB026809, U20105, and Y19241.
HTLEN77	86	1136124	1 - 1180	15 - 1194	T89857, T89583, AI349772, AL121365, AL047042, AL036396, AL121270, AI687376, AL119791, AW238730, AW268253, AI636456, AI349004, AI868831, AL045500, AI521012, AI285735, AW301409, AL135661, AL038778, AW103371, AL036802, AL047763, AI433976, AI475371, AW071349, AI436456, AL036146, AI687728, AI064830, AI349645, AI445432, AI635461, AI625079, AI250293, AI568870, AI702406, AI538716, AW195957, AI439087, AW162071, AI678302, AI564719, AL119049, AI815383, AI620284, AI498579, AI433157, AW169653, AI340582, AI349933, AI613017, AL045903, AL046849, AI866608, AL036274, AL040243, AW274192, AI590128, AI699857, AW071417, AI540832, AI440426, AI697137, AI249257, AI275175, AI281779, AI857296, AI702433, AW148320, AI800453, AI800433, AL038605, AI500553, AI920968, AI500077, AI580190, AI567351, AW074993, AI439745, AI312152, AI345735, AI349937, AW089572, AI207510, AI906328, AI690751, AW068845, AI758437, AI597750, AI499463, AI682743, AL120854, AW166645, AI497733, AI673256, AI679724, AI633419, AI866002, AI863014, AI349614, AI499131, AW080838, AI686926, AW117882, AL043326, AI440239, AI873731, AI567632, AW303152, AI282655, AI281773, AI610307, AI907070, AI631107, AI568855, AI818683, AI499393, AI224992, AL036759, AL038779, AI343112, AI866887, AA613907, AW074869, AI349598, AL120736, AI349256, AI608667, AI866780, AL048871, AW087445, AI348897, AL040169, AI682841, AI271786, AA572758, AI560012, AI800411, AA640779, AI628205, AI597918,

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HBGDI80	87	1124695	1 - 1069	15 - 1083	AI950010, AW014786, AI694670, AA171820, AI862334, AA604593, AA171724, AI697768, T11223, R41784, AI023823, T10688, and AI802300.
HELHB88	88	1225632	1 - 3305	15 - 3319	AI671143, AI580905, AI632369, AA773823, AW370310, AA773263, AA313515, AA985166, AL121153, AI382884, AA181724, AI469456, AA024936, AI750406, AA155593, AA024853, AL120063, T78993, T78788, T82245, AA155607, AI750407, AL134372, AA670080, L25219, AA247838, AF114487, AF114488, AF064243, AF064244, U61166, AF127798, AF132672, AF132478, AF132481, AP000311, AP000117, AP000193, AP000049, AP000116, AP000050, AP000048, AP000308, and AP000115.
HTEMV66	89	1152261	1 - 847	15 - 861	AI149647, AA430041, AA430250, and AW372558.



HMTAJ73	90	1063989	1 - 954	15 - 968	AI831613, AI870169, AI924408, AI368905, AI284115, AW168626, AA678670, AW068406, AA568895, AW198110, AA627558, AA857431, AW068493, AI284116, H19069, AJ010119, AF074714, and AF074715.
HE9TD31	91	815845	1 - 941	15 - 955	AI475682, AI439613, AA815076, AB033082, AF132480, and AF132479.
HGBDG55	92	1141363	1 - 521	15 - 535	AA368408, and AW614226.
HOUHL51	93	1125914	1 - 633	15 - 647	AA431822, AI341790, AW295199, AI656610, AW292290, AA037543, AA431419, AA974280, AA815270, AA037457, AI651702, AA583011, AI208605, AI419858, AA620408, AA417333, AA417321, W28051, AA251183, AI917695, W28536, and AI024754.
HEOPP67	94	1020119	1 - 959	15 - 973	AA641653, AF181972, AF181973, and AL137592.
HKAOV71	95	1165423	1 - 743	15 - 757	AF123303, and AF004161.
HDQID90	96	1137752	1 - 1007	15 - 1021	AW300598, AA669095, AI948608, AI797687, AI718165, AI129358, AI765613, AA114888, AA504203, AI701050, AI890342, AA974370, AI023212, AA504439, AI935316, AA252310, AA464174, D57415, AA280044, W46279, D54675, AA165321, AI420451, T71333, N69756, AA832206, AA521314, AA114887, AA877638, AW196653, AI027401, AI807828, AA863081, AA995204, AI831132, Z28882, Z40146, D57019, AA464762, Z25261, N87679, Z19443, AI918466, T71487, F00129, D56990, AL047889, AA278335, AW369458, W46278, AA743770, AL047888, AI809238, AA767219, AW025464, AL110306, AW302960, AW162194, AL036802, AW087445, AW071417, AI699865, AW163823, AL036274, AL041562, AI254727, AL119863, AW238730, AL045500, AI783861, AI909697, AI340603, AI537677, AI433157, AW163554, AI698391, AI929108, AI619502, AI802542, AW026882, AI783504, AI620284, AW198075, AI860783, AL079963, AA640779, AL047344, AW051088, AA572758, AL041772, AI699011, AI345180, AW082113, AW269098, AW268251, AI064830, AW161156, AL039086, AW020693, AI349645, AW268768, AW300782, AI349933, AL036403, AL119828, AI923989, AW300889, AL119791, AI497733, R36271, AL036396, AW172745, AI521012, AL041150, AW150578, AL079960, AI340519, AL048656, AL135022, AL080046,

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HFRBN81	97	1182552	1 - 4099	15 - 4113	
HFJKW01	98	1187134	1 - 475	15 - 489	
HSDFL63	99	1219300	1 - 2578	15 - 2592	AI811010, AW182310, AI669944, AA553658, AI149982, AW002490, AI138253, AI015322, AI417803, AW262574, AI338004, AW072451,

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HPJET90	100	836503	1 - 542	15 - 556	T03269, D58283, D80022, D80195, D80193, D59927, D51423, D59619, D80210, D51799, D80391, D80240, D81030, D80253, D80227, D80196, D80188, D59275, D80219, D80366, D80043, D80038, D59859, D80166, D80212, AI905856, D80269, D50995, D59889, C14429, D50979, D80134, D80378, D80024, D80045, C75259, AW178893, C14014, D59502, D57483, D59787, D59610, D51097, D80164, D80241, F13647, D80268, C14331, D51060, AW177440, D58253, C15076, D59467, D80949, D80168, C14227, AA305409, AW378532, AW178775, AW179328, C14389, AW352117, AW352158, AW177501, AW177511, D51079, AW178762, D51022, AW366296, AW360811, AW176467, AW375405, AA305578, AW377671, D59695, AW179220, AW360844, AW360817, D81026, AW375406, D80248, AW378534, AW179332, AW377672, AW179023, AW178905, AA514188, D52291, D80251, D80132, AW352170, AW352171, D80522, AW377676, AW177731, AW178907, AW179019, AW179024, AA514186, D80133, AW178906, AW177505, AW179020, AW178909, AW177456, AW179329, AW178980, AW177733, AW378528, AW178908, AW178754, AW179018, AW179004, AW178914, AW178911, AW367967, AA033512, AW352174, D80302, AW178774, AW177723, D80439, D80247, T48593, AW178983, D51103, AI535850, AW367950, C14975, AW178986, D45260, A67220, A62300, A62298, D34614, D26022, X67155, A25909, A84916, D89785, A78862, AR025207, D88547, AJ132110, AB012117, Y17188, A85396, AR066482, X82626, A85477, A86792, X93549, I19525, A44171, AR018138, X68127, AF135125, U87250, AF058696,

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HEMFC61	101	836514	1 - 701	15 - 715	AB015226, AB015227, AB015228, AL110299, X99273, and U60063.
HDTBR50	102	1174351	1 - 453	15 - 467	
HACCH94	103	847143	1 - 1399	15 - 1413	AI093369, AW292321, AA972431, N40174, AA746376, AA130392, AA286750, AA287684, R71586, R71568, R71587, H03136, H03946, R71567, AI471079, H97311, AA365025, AF039686, AF118670, AR034800, AF081916, AL161458, and AL161458.
HE8TI39	104	1223481	1 - 2820	15 - 2834	AI681280, AA251688, W60548, Z45463, H86769, F07768, H86760, Z42543, R15292, AW339546, H86765, Z44339, H86774, H86962, AA091738, R58217, F06562, AW377760, and R21166.
HEGAP32	105	1140393	1 - 512	15 - 526	AI814253, AW338148, AW192239, H72014, and AL137708.
HCWFU66	106	853005	1 - 392	15 - 406	
HUSYI29	107	853149	1 - 763	15 - 777	AA209183, AA811369, AA873372, AA304836, AW189673, AA326319, T11336, AI459087, H00191, and AL120282.
HMEFT66	108	1134131	1 - 919	15 - 933	AI269592.
HKAAR71	109	863023	1 - 963	15 - 977	AW068487, AW239526, T19084, R73854, AA984561, AA190644, R22358, R14385, AI968382, AA773650, AA425030, AW237628, AJ242972, and AJ242971.
H7TBC95	110	865922	1 - 692	15 - 706	
HAPPX52	111	637493	1 - 2368	15 - 2382	T47026.
HBGSJ13	112	1152326	1 - 744	15 - 758	W22401, W22336, and W26219.
HFKLX38	113	880220	1 - 295	15 - 309	AL136383.
HTLGP15	114	1165362	1 - 949	15 - 963	AW173250, T08271, AI372624, AA350545, T10079, AA349847, AA351693, and AF060173.
HMEGH46	115	1092158	1 - 713	15 - 727	AB033054.
HE8PY29	116	1129488	1 - 710	15 - 724	AI271550, AI753504, AA809220, AW081079, AI264068, AW386283, AI219556, AW082138, AA455733, AI382746, AA548778, W78099, AA431230, AF092137, AF100751, and AF040252.
HTDAB17	117	890384	1 - 591	15 - 605	AW410520, Z21669, AA334183, AW376427, and AC011078.
HCFCF47	118	1199931	1 - 1842	15 - 1856	AL038713, AI264673, AI685116, AI887321, AI924175, AA189081, AI610776, AI818151, AI367384,

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HDQHB19	119	1194798	1 - 1586	15 - 1600	AW195239, AW149418, AA461376, AW005579, AI392913, AI378013, AA461199, AA779830, AI860240, AI436586, AA576717, AA147800, AI276889, AW337924, AA459985, AI264931, AI203549, AW104319, AA460078, AI377235, AI291778, AI925811, AI094031, AI612894, AA147758, AA639492, AA037273, R61563, AA463275, AA767986, AI289261, AA768536, AW166255, AA832298, H59980, N47107, AA157070, AA508841, AI360737, AA417605, AA628790, AA731955, R35919, AI273576, AI301339, AI682196, AA463188, AI208175, H59937, D20738, AI391726, W42645, R14353, AI271983, N30324, T53535, AI073411, H57854, N56657, AW001677, R35723, N50317, AA514325, AI242094, AA969269, AI808646, AI280324, AA360254, AI699261, AA263061, T77863, AA551384, AA741518, AA906804, AI091790, T11446, AI208678, AA031793, AA505982, AA214523, AA428834, T12550, T11445, AB026289, and AR044150.
HAGDN53	120	1129154	1 - 1553	15 - 1567	AI671311.
HUFDB74	121	1162672	1 - 1535	15 - 1549	AW411339, AI978930, AW090612,



					<p>AI521584, C05134, AA025277, AI281896, AA190389, R80748, F13061, AA190814, T75371, R80747, AA074211, AI570569, AA296815, AA024667, F10653, AI370565, AW197990, AI254860, AC002117, AC002425, AC004671, AC005736, AC005899, AC005757, AL034549, AC003048, AF001552, AL031591, AC007637, AC009363, AC005837, AC004813, Z83822, AC005568, AC003101, AC005669, AC003010, AC004887, AL035684, AC008079, AC006312, AL022319, AC002302, M19364, AL109758, AL008583, AF111168, AC005071, AC004916, AC005088, AC002565, AP000252, AC005363, AC007685, AL009051, AL034417, AC007565, Z82245, Y14768, AC005606, L34079, AL022396, AL034423, AP000505, AL049871, AL117337, AC004104, AL024509, AC006026, AC002314, AC002352, AC005295, AL080243, AC009288, AC004963, AC004876, U63721, AL031737, Z82206, AC005666, AL021977, AC002472, AC004216, U91321, AP000501, AC006040, AC005183, Z98200, AL049709, AC007981, AC009464, Z97054, and AC005585.</p>
HNHFH24	122	1092567	1 - 1015	15 - 1029	<p>AW023111, AI792578, AA570740, AA483606, AW069227, AI634187, AA515728, AA084609, AA565911, AI457313, AA568204, AI187148, AA856961, AA644090, AA557136, W96522, AI192440, AI440117, AI369580, AI610468, AW161016, AI054419, AI245693, N34689, AW189113, AI889579, AW245860, AA602906, AI583142, AI275982, AI494417, AI679294, AI755057, AI679871, AA126005, AA502207, AI362442, AA653823, AI342183, AL037714, AI636734, AA622801, AI866970, AI185394, AA469282, F28845, AA526099, AA714011, AA501461, AA133332, AA449997, AA635433, AW274072, AA191418, AI434513, R98218, AI925869, AA808861, AA279649, AA598892, AC004656, AC005736, AL049831, AC007371, AC005777, AC007993, AC002470, AF124523, AL117694, AC004975, AF104455, AL078477, AC003043, AL049539, AC005037, AF196972, AC005274, AC007542, AL109984, D87675, AC007917, AC005209, U78027, AC005696, U47924, AC005920, AC007298, AC005701, AC005500, AL035420, AL035422,</p>

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HBGQT03	123	1188175	1 - 1204	15 - 1218	AW193981, AA576536, AW439879, AA218860, AA587394, AW206358, AI735027, AI075695, AI749755, AW328242, AI073515, AI828816, AI283940, AA452508, AI741698, F25077, AA454093, AI280249, AI826261, AI567379, AA350150, AI251129, F26225, AI354257, AW129660, AA171893, AI357160, F26293, F36700, H24638, AI270014, AI952189, AA834233, AI689497, AI688448, F17480, Z38509, T11668, N93072, AW362737, T11669, AW273866, N93071, AW328241, and AF130979.
HETLF29	124	1103959	1 - 469	15 - 483	AA960957, AI001155, and AC004664.
HOUGD29	125	1204931	1 - 2274	15 - 2288	AW243053, AI674036, AI160750, AA426073, AI299702, AI079952, AA405859, AI805286, AI828341, AW022161, W24408, AI421345, AW206919, AA351454, AW118669, AI263265, AA640181, AW134737, R13311, AW135904, AW008702, AA041245, R40791, T16675, AI418741, AI572229, AA040806, AI057025, N93105, AA954204, AF117948, and AL050031.
HTEMV09	126	1128254	1 - 1347	15 - 1361	AI818734, AA454060, AW268879, AA453640, AI377304, AI818733, AI681535, AI818743, AI741915, AA948041, AI198872, AW341578, AI267885, AA767746, AI677678, AI829855, AI677729, AW129267, AA947425, AA297313, AL041049, N67346, and AA889773.
HNTNB14	127	1128964	1 - 713	15 - 727	F12661, T74243, R60839, AA349498, AA082976, and L22557.
HE2KZ07	128	1149808	1 - 695	15 - 709	AA114993, AI696123, AI141657, AI986390, AI307294, AB004267, AF181984, AB023027, and D86556.
HSIGN57	129	1105444	1 - 1086	15 - 1100	AW408450, T78839, and AB029015.
HLHBC30	130	1106654	1 - 770	15 - 784	AI366170, W21960, AA047627, W22094, AA047570, W22769, AA359453, AA359449, AA128575, AI220321, and W22833.
HFBDJ13	131	1195217	1 - 1355	15 - 1369	AI637673, AI982948, M86084, AW161837, AA568170, AA044809, AW157364, AI686957, AA191323, AI161414, AI140787, AI752687, R17699, AA742642, and AF030131.
HTPGG25	132	1217208	1 - 2771	15 - 2785	AI681123, AI741848, AI636347, AI973055, AI554720, AI768326,

					AI871117, AI333117, AI745311, AW340966, AW192924, AA706712, AI091179, AI677802, AI889659, AI688189, AI804323, AI298377, AA535027, AI830304, AI139157, AW089901, AA018361, AA410579, AA416567, AW073842, AW316637, AI827376, AA417232, AI372513, AA411560, AW001905, AI796719, AI400032, AI334363, AI452964, AI085075, AI888902, AI400560, AA308319, T33187, AI372512, AI332395, AA877699, AA485507, AA017127, R85136, H94860, T33188, AW016699, AA324901, AA988884, R18537, AI925753, AA993373, AI263531, W05059, AA282629, F29641, AA378627, AA625328, H58095, R17859, AA354334, AW337874, AI559961, AA282410, AA126985, AI014243, AI671403, F07835, R01402, AA485352, R41526, Z39066, F04091, R43109, W04796, R01401, Z42943, AA128150, AW375092, C04525, T25085, F17839, N74669, AW371533, AW058382, AW371557, AL117482, Z61430, AW612722, and AW662030.
HSSMT34	133	911294	1 - 540	15 - 554	AA378627, F07835, and AL117482.
HWWDN3 4	134	1152430	1 - 1254	15 - 1268	AI671062, AI023330, AW243448, AI990947, AW081367, AW391909, AA448391, AI984688, AA448394, AI283270, AW014216, AI344135, AA127530, AA335984, AA377148, Z42084, R12430, and AA400585.
HCEPW85	135	911374	1 - 302	15 - 316	N83965, AA326737, and H14153.
HMTAW83	136	1071602	1 - 487	15 - 501	AI908321, AA831896, AR058970, AR058968, A68194, and AR058969.
HDMAV01	137	1194697	1 - 1796	15 - 1810	AA639636, AI631313, AW295120, AA182022, AW085587, AI805706, AA181842, AA732237, AW275826, AI215758, AA482475, AI802881, N50527, AI582673, AI581648, AA687232, AA742653, AI678872, AI937512, AA043083, N95362, AA130860, AW303909, N50583, AA186576, AW149048, AA743626, AA972227, R82179, AA988476, H19646, AA872660, AA476734, AA040856, AA074515, W93062, AA649136, AA186539, AA443881, AW021342, AI039487, AA252656, H22712, AW006472, AI342673, N72971, AW316519, H01103, R82221, AW079113, W02736, H19647, H43529, F23483, AI681977, AA989257, AA357239, H01104, W21036, AA872966, AI908321, N93561, R57677, AA984133, AA306556, AI423661, AL120709, D19838, AW295339, AW403073, AA100099, H38954, AA297943, AA130916,

					AW007473, A68194, AR058970, AR058968, and AR058969.
HDPSR74	138	911396	1 - 709	15 - 723	
HHEZT58	139	1160657	1 - 2197	15 - 2211	AI653410, AI808115, AW103846, AI954664, AI809351, AL038027, AW365646, AA598677, AW118178, AA461436, AA461119, AI915224, AI452666, AI962619, AA384806, AA021033, AA317505, AW179253, AA054648, AI949041, R59010, H21414, AW450327, AI084523, AA813068, AW021195, AI242505, AA768247, AL046262, AL138455, AL035847, AA714441, AL042853, AI570389, AI821062, AA804728, AA760655, AA665057, AL042753, AL045943, AI493858, AW079656, AI027175, AA504562, AL049552, AF162270, AC004834, AP000208, AP000130, AP000247, AL049557, D83989, AL022315, AC009501, AL031281, AL109758, AC006313, AC002464, AC005291, AC002565, AC004837, AL022313, AL031393, AC007172, AC018767, AL021393, AL022165, AF222686, AC004987, AC005091, AC006112, AL110269, AC006115, AC011331, AC005156, AC002430, AC005088, AC004686, AC007384, AC005902, AP000697, AC004883, AC006501, AC006039, L30117, AL035458, AL035461, AC010206, AL035067, AL034417, AC005057, AC002472, AP000009, U96629, Z83840, AF053356, AC004383, AF091512, AP000344, U67211, U66059, AC000004, AC003070, AL096791, Z82206, AC005081, AC008067, AL034400, and AC007284.
HTLDU05	140	911649	1 - 589	15 - 603	AA437044, AF113527, AB023062, and AF113520.
HTLET56	141	1189721	1 - 1390	15 - 1404	AI968198, AI655275, AL044119, AW003563, AA397903, AL044168, AL044118, AW016204, AA625705, and Z74696.
HTLCA95	142	911655	1 - 1148	15 - 1162	AI028227, AI798166, AI968058, AI962770, AC012616, and AC012616.
HTEJT86	143	1090517	1 - 1644	15 - 1658	AI290635, AI097065, AI811210, AI655508, AI655489, AA402182, AA373381, AA948283, Z21336, AI984919, AI825441, Z21335, and AW467143.
HTEMA54	144	1134919	1 - 1483	15 - 1497	AI954673, AI220421, AA813119, AA382989, AI024406, AF113526, AB023063, and AF113519.
HTLGJ17	145	1135518	1 - 573	15 - 587	
HOUES64	146	918119	1 - 304	15 - 318	
HMSCD15	147	982250	1 - 642	15 - 656	AA864599, AA828277, AW270419, AA761244, AA262754, AA779760, W37119, AA206843, Z42584, AA206842,

					and AB011126.
HDQDX20	148	1223474	1 - 2688	15 - 2702	AI905612, N63562, N75655, N94726, AA297704, N64807, AW265468, AA601376, AW162314, AW162332, AI318548, AW410844, AL042753, AL121039, AI702049, AI547110, AI919048, AA845690, AW021674, AA280886, AW328185, AI076729, AW327673, AL138455, AA526542, AL118628, AW148821, AI754926, AI344906, AI064968, AW419201, AI065031, AI129421, AL041924, AI090377, AI252005, AI254463, AW409621, AA313025, AA610644, AA760655, AI797998, AI821901, AA557945, AA595661, AI860423, AA831426, AW021399, AA765899, AI174827, AI251024, AL042667, AL042670, AI003068, AW439224, AL042377, AI567676, AL134524, AI905408, AI570067, AA527633, AW022796, AI025355, AA525753, AI133355, AI224583, AI609992, N95424, AI281622, AI446618, AI745666, AA632355, AI791659, AW085626, AI815425, AI819419, AI884404, AA828840, AA631915, AI049845, AA133568, AI921744, AI114755, AL044966, W27084, AA524604, AL039436, AA084439, AI279417, AW023975, AW239465, AI753131, AW275432, AA847341, AW177869, AW192930, AW409626, AI049643, AW338525, AI828721, AA935827, AI857834, AI348780, AI744963, F35374, AI434103, AA601712, AL138262, AL138431, AW272815, AI445699, AI270280, AI888050, AW029626, AI150934, AL042731, AI003391, AL044701, AI924950, AA535558, H86399, AI733523, AW020612, AW069769, AA568433, H47461, AA167656, AL079698, H62123, AA196994, T03928, AI078409, AA015948, AI049892, AI815770, AW303052, AA558488, AA315052, AF169035, AF085233, AL049694, AC006084, AC006581, U93163, AC007298, AL022315, AC007050, L78810, AF196779, AC005081, AL031680, AC004891, AF113676, AC004895, AC005921, AC005015, AC005701, AC005291, AF207550, Z98941, AC006079, Z83844, U95739, AC005553, AL031846, AL021391, AC004263, AC004808, Z99716, AL008582, AC006312, Z93241, AC005519, AL121603, AC006115, AL080317, AL049538, AC002558, AL121595,

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HLTHP86	149	1110457	1 - 1837	15 - 1851	AA663589, H16878, R56761, H84971, H16267, Z44040, Z44727, AA363673, T95749, H09671, AA809486, R91239, N50504, AA834548, N58608, AA872305, and AF161420.
HMSOL52	150	1182715	1 - 1289	15 - 1303	AI911515, AI360955, AW028045, AI796049, AI609712, AW195544, AI184337, AI470056, AI361065, N34939, AI017177, AI038779, AI440241, AI651451, AA789292, AA854683, AI765258, AI702748, and AA384884.
HAHGD33	151	1219819	1 - 2211	15 - 2225	AA058874, AA778668, AW408302, AA205441, AI127967, AI887424, AI479839, AI697118, AI313146, AI992196, W01185, AI828049, AA196613, AA988948, AW410815, AI569584, W44348, AI754108, AI858157, AW161181, AI809391, AI418172, AW378448, AW378426, AI554365, AA064738, N41640, AI129499, AW080159, AI079282, AI624100, Z43369, N29634, AA160313, AI476090, AI748939, H40577, W52734, AI828528, AA984486, AA723784, W73106, AI811703, AI982708, AA610087, H45144, AA975653, D31100, AA064739, AA226860, W79308, AA976982, AA961166, T35036, AA044358, AA969553, AW380268, AA961174, AW380277, AA192146, AA348984, C21229, R16767, AA348983, AI536815, W59987, AI632654, T35774, AW292300, T08259, AI368455, AI701960, AI969407, AI559435, AI285876, AI243806, AA232389, AI476704, AW410816, AA588076, AA918087, AA989405, AA639598, AA862740, AA160321, AI904952, Z39439, H46434, R10018, AA227210, N78192, AA977128, F35561, R40005, AW050898, H14918, AA852243, AA043840, N74228, AA719438, W45701, AI879824, AA249020, H79060, AA852244, T80752, H45445, AA353126, AA320390, R45977, AI187729, AW385198, AI364441, AI284294, AA862396, T81225, H46980, AA642250, R57404, H14625, AA295773, W79389, T12193, W52140, T81300, R13945, AI918467, T47464, AA043841, Z43504, AA404490, AA627362, D45662, AA205277, AA196528, C21486, AI739190, AI123849, AI205909, AI025702, and AF113249.
HHEHC53	152	921783	1 - 896	15 - 910	AW408302, AW410815, AW161181,



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HE2PB01	153	1206665	1 - 1753	15 - 1767	AA443164, AW020571, AA532437, AA315526, AW118680, AI167234, AI890631, AA744921, AI401545, AW195349, AW152040, AW074628, H06431, R74385, AA862392, H23357, AA649701, AW362722, AA160546, AI880570, D62917, AA973615, H23246, H46816, AI819867, H00507, AA329368, R21787, R21742, AA463453, C05953, R25958, R26764, AA639080, AI494615, AW070869, H71752, T84284, AA767232, AA160663, AI824357, and AF161399.
HOUDP52	154	1219522	1 - 1735	15 - 1749	AA126458, AI091270, AA535353, AW129933, AI653554, AA809485, AI638693, AI208921, R73542, AW088345, R72907, AW105725, AA483641, AI828781, AI350843, AI970412, AI971578, AA121009, AI989884, AI671096, AI962165, AI632336, AI241787, AI580332, AA991236, AI587241, AA317304, AI655218, AA853441, and AI971684.
HHGAE47	155	1127881	1 - 733	15 - 747	AW025529, AI475932, AW026010, AA886335, AA662803, AI056120, AW050607, AI885090, AI244837, AW449834, AI375435, AA878578, AA922036, AW197722, AA161103, AW058170, AI393408, AI056614, AA643750, AI560410, AI749095, AI720931, AI446208, AI913781, N52768, AI268967, AI277003, AA657904, AI914599, AA910277, AA485405, AI192693, AW050712, N52783, AI673692, AA631339, AA485566, AA158820, AI619710, AI560351, AI919380, N57590, AI832600, and N57604.
HMCGL45	156	1165349	1 - 1136	15 - 1150	AW025529, AW026010, AI475932, AA886335, AA662803, AI056120, AI885090, AW050607, AI375435, AW449834, AI244837, AA878578, AI056614, AA922036, AW058170, AW197722, AI393408, AA161103, AI560410, AA643750, AI749095, AI720931, AI446208, AI913781, N52768, AA910277, AI277003, AI268967, AA657904, AI914599, AI192693, AA485405, AI673692, N52783, AW050712, AA158820, AA631339, AA485566, AI619710, AI560351, AI919380, N57590, AI832600, N57604, T25136, and AA299927.
HELEF11	157	1153884	1 - 1324	15 - 1338	

HETJX04	158	1212235	1 - 844	15 - 858	AA853282, AA370481, AA625156, AB025258, and AB025259.
HSOBC04	159	1165357	1 - 1194	15 - 1208	AA115298, AI741325, AI688227, AI819333, AA452504, AI742595, AI925664, AI174530, AA115338, AA563582, AA461615, AA807844, N94422, W58424, AA569395, AI095261, AI142563, AA687480, AI567500, AA479551, AA582573, AA779677, N24393, AI280806, AI081428, AI863187, AA988617, AA834079, AW302361, AI362861, AW273442, AA553678, AA150123, AI752480, AI312661, W52661, AI298150, AA463418, W72509, AA024450, W72139, W79868, AI037968, H39596, AI028169, AA477651, W02690, AI198327, AI952450, AA926794, AI087245, W74236, H98040, AW004736, AI870989, AI689546, W76066, AI332748, AA150031, AI349417, W80872, H99144, AI334346, W52767, AA496878, AW166280, R40403, H25985, AI357863, R55375, AA363023, AA378409, AA595996, AW104147, AI687489, AI376184, T32290, AI979074, N26307, H97338, N95244, W77880, AI917258, W25604, AA024802, AI536791, AA577352, AA328156, AA359865, AA367475, AA358275, AA461442, W80763, T09474, AA987427, AI611160, AA888165, AA595303, AI918172, W30769, AI201782, W21074, AA187662, AA411955, AA090719, AA411956, AA935961, AA451977, AI371307, AW074526, N79974, N39751, AI635472, AI612934, AA478489, AA102215, AI802295, AI750502, AA496836, AL133116, and L07063.
HE8PW83	160	1069980	1 - 1219	15 - 1233	AA203427, AW024967, AA707382, N74230, AA875830, AI051580, AA975082, AI650913, AI651056, AA707184, N69106, AA938679, N69120, AA704705, AI283739, T72088, AW135507, R10286, R10287, AA010205, AW296131, AI085405, AA333931, AA873194, W01187, AF121182, AB002584, D38100, and AW611663.
HWLEA48	161	927676	1 - 415	15 - 429	AA130828, AF169034, Z98752, and AF169033.
HNHNP81	162	1129143	1 - 1036	15 - 1050	AW366296, D80045, AW375405, D51060, C14014, D58283, AA305409, D80253, D80024, D80166, D59619, D80210, D80240, D80366, AA514186, C14389, D80043, D81030, D80133, D80247, D59859, D80212, D51799, D80164, D80219, D51423, D80022, D80391, D59787, D80195, D80188, D80248, C14331, D59502, D59467, D57483,

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HFIDL68	163	1123641	1 - 1148	15 - 1162	AI805323, AI375172, AL119457, AL119399, AL119511, AL119324, AL134524, AL042544, AL043152, Z99396, AL042382, AL043168, AI431323, AI582910, AL038837, AL079794, AL037051, AL036725, AL037081, AL046052, AA631969, AL039074, AW151132, AL036418, AL042866, AW058275, AL045413, AI282249, AL119443, AL039085, AL039564, AL039456, AA580663, AL036858, AL039156, AW151974, AI927233, AL039108, AL038509, AI539771, AI432644, AI537677, AI494201, AL039109, AI804505, AI500659, AI815239, AL039128, AI446536, AI866465, AI815232, AI866691, AI801325, AI500523, AI538850, AW392670, AI358271, AI887775, AI582932, AI923989, AI590043, AI872423, AI284517, AI500706, AI635082, AI445237, AI491776, AW151138, AI289791, AI926593, AI889189, AI521560, AI500662, AI285417, AI582912, AI284509, AI539800, AW172723, AI440263, AI538885, AI889168, AI866573, AI633493, AI434256, AI866469, AI805769, AI434242, AI888661, AI500714, AI284513, AI888118, AI285439, AI859991, AI436429, AI889147, AI355779, AI623736, AI581033, AI371228, AI932794, AI491710, AI440252, AI431307, AI440238, AW089844, AI567971, AI866786, AI860003, AI610557, AI431316, AI242736, AI539260, AI828574, AI698391, AI887499, AW151979, AI539781, AI702065, AI539707, AI801286, AI885949, AI638644, AW089557, AI285419, AI559957, AI521571, AI469775, AI866581, AW074057, AI567953, AI815150, AI446495, AI867068, AI952433, AI889191, AI225248, AI698352, AI371229, AL036924, AW151136, AI440260, AI584130, AI355126, AI440236, AA761608,

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HUJCT05	164	1165261	1 - 1632	15 - 1646	AW268357, AI889091, C15588, AI949350, AI056961, AI124874, R39133, AA887911, AW023386, AC003962, and AF155116.
HTEGO05	165	932583	1 - 1086	15 - 1100	AA059465, AA059211, AA731209, AA236961, T86500, T87461, AL024498, and M35862.
HRDBH58	166	1226719	1 - 2731	15 - 2745	AI863355, AI863364, AI674922, AI754389, AI056058, AW295190, AI623178, AW131720, AI949042, AI056059, AA356949, AI668970, AA620354, C14389, C15076, D59467, D80164, D59787, D81026, C14331, D51423, D81030, D80195, D80391, D80166, C14429, D59275, D58283, D59859, D59927, D80196, D80022, D80253, D59889, D59619, D80210, D51799, D80240, D80043, D80227, D59502, D59610, D50995, D80212, D80038, D80188, D80219, D57483, D80366, D80269, D80193, D51022, D50979, AW177440, D80251, D80241,

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HSDGW22	167	934467	1 - 312	15 - 326	AF071071, AF170303, AF170304, AF077658, and AF071070.
HNTMD79	168	1126594	1 - 649	15 - 663	AA305176.
HCE5J51	169	1197900	1 - 2796	15 - 2810	AA622725, AI022884, AI003586, AI420804, AI682458, H19352, AI808077, AA324320, AA855153, W19561, AA325225, AA324316, AA853261, H18913, H11459, AW014428, AI148776, AI659608, AI675556, AW006008, T26639, AA853262, and U71294.
HHEFQ42	170	1151482	1 - 1261	15 - 1275	N21687, AA447158, W42824, AA046565, AI693814, AI092205, AW377670, AA443786, AI160460, AI808004, AA160291, N34495, R70372, AW008266, AA393368, AA769319, AA977890, AI332771, AA089858, AA367462, AI806021, AA160290, AA164499, AA357550, AA909368, AI337806, W42734, N31093, AA521439, AA600712, AI587601, AI491781, AA047086, AA933922, AA078980, N49165, AI623941, AW163834, AW020328, AL036705, AW151974, AI249946, AI588892, AL138406, AW021717, AI648494, AW051088, AI345131, AI619820, AI500061, AI434731, AA641818, AI524654, AI860027, AW020046, AL120307, AL038505, AW087987, AI919500, AI334893, AW020397, AI401697, AA834534, AI538850, AI698391, AI659043, AL036901, AI440238, AI890907, AW075382, AI799313, AI866465, AI696340, AW151132, AW083111, AI590043, AI627714, AL134840, AW195253, AI473536, AI499325, AL138399, AL047100, AI884318, AI619525, AI249389, AI244249, AL048323, AI590755, AW161098, AW129117, AL048340, R36271, AI635634, AA765029, AA229532, AI491852, AI859991, AI690813, AL039730, AA503384, AW196720, AI373276, AI741158, AI289791, AI699823, AI345745, AI431323, AI538764, AI538885, AI301710, AA857847, AI244343, AI287233, AI241678, AW132034, AI277325, AA977968, AA808175, AA575874, AI559752, AA001397, AL037602, AL045413, AI499986,



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HLQDC55	171	1082368	1 - 691	15 - 705	
HFPHI62	172	1195825	1 - 3146	15 - 3160	AA988953, N63548, AA663569, H38453, H15532, H41422, AA976078, N94873, H46380, N51089, R88023, H41541, H48172, H38492, R18083, AI423964, AI003013, H11023, AI421373, R90757, R88479, H85702, R40487, AI208504, R42977, R87980, AA338374, AW207073, H15589, AA319224, AA325807, H84794, H10745, AA338373, W28283, R13057, AA325143, N54215, AB023202, D13613, AC004551, D29965, U12571, and AC004465.
HE8QH09	173	1152238	1 - 1439	15 - 1453	AW451023, F08666, Z41650, AA594745, D45858, D28512, and AB000893.
HFAAX29	174	1128791	1 - 842	15 - 856	AL119825, AW367632, AA333024, AA164770, N53725, AA984472, N44616, AF000423, AB026808, and D38522.
HHFOC79	175	1182276	1 - 2091	15 - 2105	W37105, W72587, AI417917, N40695, N40709, AI750977, AA399093, AA528204, AI160861, AI167229, W56631, AA845109, AA450162, AA740816, AA708621,

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HOGEQ43	176	1223485	1 - 3732	15 - 3746	AW001408, AW025576, AI167306, AW183595, AW206547, AA421304, AI884557, N53420, AI961482, AI366803, AI471722, AI277353, AI208800, AI285232, AI923048, AI002657, AA905774, AW444453, AW072850, AI002663, AA917870, AI420232, Z40060, AA995040, Z44009, AA743874, T91698, T91710, AA421383, T77085, AI536628, AA768502, T92932, F07259, AA465719,

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HCECQ23	177	938398	1 - 796	15 - 810	AI480182, AI500178, AI873131, AA322958, AA322718, AI936088, R85125, R90888, H05353, AA338672, H51247, R35934, AW139057, H05303, R49451, R42549, H29245, AI654790, AI638508, R51648, AW149807, R44423, AI458144, AI419465, F02105, AI499775, Z40525, F09051, R85080, H51217, AI569283, D29763, D64009, and D64010.
HTGAU79	178	1178621	1 - 1081	15 - 1095	AA579641, AI149891, AI028588, AA659710, AI889233, AA461487, AA460132, AA682750, AA113277, AI753378, AA985248, AI421205, AI914588, AI493749, AA633392, AA936668, AA722409, AI424537, AA233726, AW268600, AA516077, AA483490, AW082930, AA074311, AI752615, AI989665, AA046575, T87841, AI087102, and AL031055.
HE9FI33	179	1156432	1 - 1550	15 - 1564	AA010320, AA010384, and R01100.
HNHCP79	180	565781	1 - 288	15 - 302	
HTLIY52	181	1194806	1 - 1338	15 - 1352	AI827749, AI580407, AI819667, AI025487, AI223109, AI150036, AI024234, AW087713, T18864, AI479322, AA883975, AW341589, AA860213, AI831802, AA913074, AA608857, AI050685, AA860223, AA948538, and AI075930.
HRAED74	182	942527	1 - 691	15 - 705	AC005940, L42810, S83194, AF117384, and AB023658.
HFKN77	183	943757	1 - 719	15 - 733	
HTEMU66	184	1205381	1 - 1077	15 - 1091	AL039924, AL045794, AW013814, AL036630, T02921, AL044412, AL044364, T24119, T24112, AW450335, AL039476, D51250, AL039521, AL045341, AL039386, D80043, AL040992, AL039109, AL038531, AL037726, AL039629, AL039659, AL039625, AL039648, AL038837, AL039074, AL039566, AL039678, AL039108, AL039538, AL039564, AL039509, D80253, AL039156, H00069, AL039128, AL044407, AL036973, AL042909, AL045337, AL037051, AL045353, AL039423, D59787, AL039410, AL039150, AL038025, AL044530, AL039459, AL038821, D80219, AL036725, AI535983, AL043422,

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HWAGU62	185	1206797	1 - 2192	15 - 2206	<p>AI913535, AI762854, AI758705, AI677912, AI740876, AI825702, AA412665, AI800271, AI525869,</p>

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HFPFB39	186	1198036	1 - 2090	15 - 2104	AI631883, AI767614, AA018867, AA019175, R56792, AI497937, N95592, R44001, AW271411, R56793, Z38315, and Z42023.
HPMFI38	187	1165993	1 - 975	15 - 989	AI765950, N54154, H12876, R93383, R56658, R16970, AW205252, R25871, AA886432, R93384, R16914, and N58678.
HBXDJ07	188	946830	1 - 1470	15 - 1484	H11405, R55569, N27906, H20863, N25140, and U27708.
HOFMS43	189	1152417	1 - 1065	15 - 1079	
HOVCO14	190	1091087	1 - 592	15 - 606	AI701529, AA994711, AI192036, and AC007198.
HTEPE35	191	1105272	1 - 825	15 - 839	AI935040, AA861064, AA933697, AA707583, AA872105, AA398866, AA609626, AA620685, AA435866, AA812556, AA781805, AA993718, AF012362, AI217888, and AA824315.
HE8UA52	192	1229490	1 - 3408	15 - 3422	AI742521, AW274710, AA723595,



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HOUBE50	193	1090776	1 - 1175	15 - 1189	AL120487, AA578623, N85038, AB033086, and AB023168.
HJAV28	194	1165229	1 - 1587	15 - 1601	AA913364, AW027373, AW305275, AI799031, AA588138, AA775450, AW117480, AW190848, AA411334, AA866178, W61038, AA411335, AA775769, AA769134, N30274, AI493881, AA075643, AA614747, AA627544, AI147666, AI025647, N30309, AA075644, AA812101, N94919, AW339918, AI140386, AI138196, AA868924, AA284960, AI554835, AI343592, AI128292, AI143201, AI017993, AI492556, AI347094, N42630, W72001, N20511, AI679099, AI933338, AA040263, AI268560, W69402, AI354734, T32745, N29505, AA872581, AI017992, N41996, AA863176, AA719956, F28362, AA448442, AI679673, AI142803, AA732322, AA993672, AA444022, AI624135, AA846235, AI004213, W44778, W44314, AA305351, AI285067, AI304774, AA448307, W65308, AW274816, W37097, AI475118, N25416, D79265, AI872626, AI186604, AA682603, AA285117, AI149185, AI339799, AI344717, AA996037, AA444000, AI128110,

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HAQBZ89	195	1083554	1 - 1403	15 - 1417	AI436552, AW071796, AI299053, AI334145, AI613263, AI921361, AI161282, AI018067, AI984679, AI934889, W52097, AI281829, AA236375, AA121294, AI342850, W16450, AA729045, AA608803, AW135827, N78654, AW193167, AI689644, N46334, AI159772, AA456075, AA130122, N63941, N58535, AL042537, AA367722, AA969946, AI432541, AA829498, AA781924, AW304842, AI299054, T69736, AW194058, AW170746, AI382899, AA862441, AA257021, AA345125, AI049756, AI983846, AI129698, T70395, AA130159, AA455578, AA833560, AW351523, AA451639, AI205015, and AW512516.
HELHF07	196	949067	1 - 327	15 - 341	AC073669, AC074220, AC074220, and AC023605.
HE9QQ22	197	1127726	1 - 748	15 - 762	N90644, T72234, R83190, AA010242, N90655, N90629, N94219, N65959, R83191, D50995, D80164, C15076, C14014, D59502, D80247, D59275, D80195, C14389, D81026, AA305409, D59467, D80227, D50979, D80269, D51799, D80022, D80166, D58283, D80193, D59619, D59859, D80210, D80391, D80240, D80045, C14331, D59787, AA514188, D51423, D80253, D80043, AA305578, D81030, D80188, D80439, D51060, D80038, D80212, D80196, D80248, D80219, D80366, D51022, AA514186, D80522, D59927, D80302, D80024, D51103, D57483,

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HSDSB06	198	1128280	1 - 2674	15 - 2688	AI766068, AW009631, AI817090, AI765056, AA127727, AW069132, AI372853, AA877550, AI432584, AI129942, AA610281, AA102362, AA625117, AA948383, AA430522, AA447454, AW194550, AI635683, AA532394, AA446651, AA724535, AI220147, AW263019, AA430607, AA019158, AI752984, AI198643, AW389353, AA045561, AA516463, AW197881, AA186967, R67323, H86071, H67029, AA588072, C01179, AI457685, H22246, H12434, AW378928, H12433, AW050669, H68111, AA768085, AA054561, R33871, R66487, AA054621, AA478635, N55248, AA359925, AA385529, R33870, W68645, AA961423, AW002948, AI802284, AA377365, D31590, AI742590, AW275740, AI819328, AL133047, D89677, AF003234, and AW517631.
HACAD35	199	949199	1 - 1460	15 - 1474	AI817458, AI810494, AA442536, AI271432, AA228126, AA227978, AA687616, AW316554, AW351633, D62849, AA346825, AW262553, AC007363, and AC007363.
HEQAP17	200	949358	1 - 807	15 - 821	AI131555, AI769466, AA215577, AW190975, AA258335, AA258499, AL044652, S63848, Y17793, and A49045.
HMTBB17	201	1128589	1 - 462	15 - 476	AA582539, AI963340, AI097093, AA286856, AI761614, AI149781, AI460219, AI032670, AI636161, AI819154, AI089302, H12042, AI811219, H05308, T95010, AA836993, AW271462, R37000, AI001803, AA904906, AA743196, AI015200, AA453607, F05000, AA578803, AI241466, AI033193, AA330970, F03322, F01968, AA037601, T75492, N47542, AW183219, AI288171, AA054759, F01965, AA651907, AL122084, and AL049611.
HKGDE58	202	1129137	1 - 1325	15 - 1339	AW271462, AA582539, AI963340, AI097093, AI460219, AA286856, AI761614, AI149781, AA448686, AI032670, AI819154, AI089302, AI636161, H12042, AI811219, AA287162, AA836993, T95010, AI001803, AA904906, AA743196, AI015200, R37000, H05308, AA453607, F05000, AA578803, AI241466,

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HCHMW40	203	1144323	1 - 941	15 - 955	AI732539, AI791495, AI791325, AA709067, AW082062, AI791964, AI732667, AA505923, AW057561, AI909857, AI909862, AA601601, AI909853, AW082594, AI812032, AI310332, AI610362, AI627880, AW403717, AA427700, AI687065, AW151136, AI783504, AW071417, AI446373, AI280670, AI886022, AI345253, AI345677, AW189415, AI800453, AI284131, AI285826, AW051088, AW022682, AL134999, AI280732, AI680162, AW168485, AI610645, AL079963, AI680498, AI805688, AI886181, AL040241, AI312428, AW020095, AI537677, AI498579, AI400725, AI866741, AI251221, AI932915, AI589947, AI343059, AI349933, AL119863, AL036548, AI345608, AI690410, AI571909, AI478123, AI335426, AI348777, AL041772, AW274192, AI590686, AI869377, AI364788, AL036638, AI310606, AW301344, AI568765, AI922901, AI345471, AI366992, AI863321, AI336575, AI950877, AI334450, AL120853, AI932794, AL110306, AI929108, AA908294, AA225339, AI608936, AI345746, AI251205, AW081255, AL045266, AW088134, AI824576, AI280661, AI659795, AI537617, AI520809, AI812015, AI569309, AI828568, AW087915, AI434741, AI648502, AI919107, AI352497, AI678357, AI888944, AI308035, AI886123, AW198075, AI174394, AI933589, AI686552, AW168709, AI587606, AI783861, AI468872, AW083778, AW163823, AW084219, AW103886, AI952920, AI955866, AI628217, AI933785, AI697324, N80094, AI633419, AI554218, AW151785, AI963216, AI445165, AI590120, AI431909, AI866002, AI829327, AW268302, AI433976, AW168373, AW149227, AL119791, AI282326, AI828731, AW302973, AI499463, AW079159, AI251830, AI619716, AW268060, AI288285, AW072719, AI539028, AW023590, AA493923,

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HE8QZ34	204	1143411	1 - 1873	15 - 1887	<p>AI346431, AA600828, AI654068, AI627476, AI692275, AI417541, AI033899, AA127745, AI634873, AI653646, AI564494, AI635599, AI434505, AA127671, AI818370, AI912908, AI311461, AI914324, AI371325, AA622400, AA225468, AA811711, AA593299, AA633708, AA768315, AW236744, W28575, AA210809, AW071534, AA565871, AI371817, AA287455, AA210690, AA225526, W00592, AA085933, N68915, AA908320, AA281938, AA112126, R35313, AA225852, AI277214, AA465202, AA580581, R86156, W19885, AA455978, AA286753, AW020244, AA636108, AW405566, AA452896, AI863445, AI055868, AA594111, AA772109, T06553, AW195517, AA385668, AI673762, AA384297, AA730967, Z41832,</p>

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HWAFG04	205	1227627	1 - 1385	15 - 1399	AW239548, R23870, F07734, D54154, AA297059, C14980, AI418298, AA088799, C15480, R46685, AA325059, AA974700, H42947, AI302185, AI652375, AI394630, AA364780, AI936871, AA382960, AI559159, AI025217, AI983297, AI025310, AW002416, AW206793, AA593826, D57560, AW140018, AW192088, AI017077, AW401787, and AW373232.
HTEKT33	206	1075836	1 - 2105	15 - 2119	AL044351, AI817283, AI024728, AI744491, AW072402, AW378258, AW072368, AL044352, AW192336, AI337979, AI627480, AI696944, AW369691, AI860188, AW378250, AW378255, AI627747, AL042027, AI926480, AW378166, AW068812, AL047150, AW029453, AA464338, AI801683, AI890113, AI745169, AI623625, AW069248, AA573520, AW378242, AW369645, AA722200, AW152579, AI679464, AI754467, AW069250, AI863890, AI420021, AI754556, AI017236, AA490151, AW337220, AI423346, AW385997, AW074087, AI015943, AI689287, AI587461, AW369622, AA428544, AI222770, AI143319, AI720991, AI754784, AW152549, AI143344, AI589285, AA582432, AA826662, AI587096, AI753623, W68196, AI754168, AW383083, AW383201, AA045260, AA844711, AW378254, AI753721, AA595042, AA432225, AI079642, AI754630, T63365, AA598475, AI962914, AW378175, T51018, AA634355, AI752372, AI922832, AI696875, AI675948, AI371134, AI598124, AI371125, AI143853, AI143041, AA779030, AI281593, AI216596, AI753783, AI313439, AI571587, AA931107, AA598793, W68075, AI339836, AW378191, AW351438, AA045150, AW169487, AI751039, AI051715, AI148583, AI970742, AI338164, AW007286, AA541755, H12770, AI694286, AI309918, AI358476, AI582893, AI304450, AA026628, N78364, D53342, AI041911, AW024056,

					AA935545, AW130479, W39177, AI354525, AI376810, N34461, AI808534, AA778065, AW192368, AW244107, AI589361, AI282168, AW028623, AA778055, AW150321, C17178, AI478760, AI244443, W86793, AI087238, W00916, AI446098, AA719311, H24846, AI209065, D57494, AA599264, W94304, AI083988, AI278860, AI935852, AI091878, AI829367, AI751862, AI278832, AW382654, AA620910, AW262984, W80605, AA834064, N94128, N62598, W72648, AW383076, AA026668, AW193117, AA084560, AI752585, AI624605, H49416, N55278, AI360559, AI520753, AW068113, AW370175, AL046974, AI815020, AI753242, AI963416, AI147036, H42782, AI571697, AI751040, AW242018, AI570991, H94334, AI953531, N57952, AI141927, AI752371, AW242264, D57929, W79127, W01207, AL048585, AW068071, AI624798, AA564187, W39458, W44950, AA358927, W02137, AW239018, AI751675, AA485695, AW262921, N67498, H24847, AI889395, W01047, AA329561, AA777026, N65969, AL048586, H64363, AA916595, W32452, AA455154, AI539001, AI702017, AA334020, AW382258, R77374, AA541671, AA505619, R83643, AW024024, AA953041, AI636202, R19771, R83636, F27591, F07112, F27593, AI751863, AW068339, AI920900, F06387, AI014855, H63926, H78881, AA953591, D51304, AI879452, AA718967, W87292, D56506, AW365001, N70195, M14219, AF138300, AR012319, AC007115, AF038127, U83141, AF125537, S76584, Y00712, AF125041, AF140270, U03394, X53929, L01131, AF138302, M98262, L75825, L01125, AF138304, L01127, L01130, L01128, L01126, L01129, A62298, A82595, AR050070, and A82593.
HBXDM07	207	1206657	1 - 2110	15 - 2124	AI672363, AI589203, AI631066, AI810806, AI654696, AA700425, AW249815, AI271343, AI127886, AI581871, AW044228, AA188637, AI769068, AI142895, AA084919, AA451876, AA482390, D20750, AA463624, AI351007, AI240526, AA074549, AW090810, AI143138, AI762690, AI752042, AI912224, R56540, AI127226, AA626231, R56145, AA190610, AA085022, AI336960, AI962785, AI690749, AA035626, AI762681, AA346622, AA847532, AW139485, AA426415, AI625813, AA443041,

					AI940415, AA062842, AA599682, AW374890, AI659071, AA953644, and U35245.
HFPFA83	208	955614	1 - 723	15 - 737	C14389, C15076, D59467, D58283, D50979, D80522, D80164, D80166, D80195, D80043, D80227, D81030, D59275, D59502, D80188, D59859, D80022, C14331, D51423, D59619, D80210, D51799, D80391, D80240, D80253, D80038, D80269, D59787, D80193, D59610, D80212, D80196, D80219, D81026, D59927, D57483, D80378, AW177440, D80366, D80251, AA305409, AA305578, D59889, D50995, D80024, D80241, D51022, D80045, C14429, D51060, C75259, T03269, AW178893, AW179328, AA514188, AW378532, D80248, C14014, AW377671, D51250, AW369651, AW178762, AW178775, AW177501, D80134, AW177511, AA514186, D80133, AW176467, D58253, AW360811, AW352117, C05695, AW375405, AW352158, D80268, AI910186, D80132, AW366296, AW178906, AW360844, AW360817, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, D80302, D59627, AI905856, AW378540, AW352171, D80258, D80439, AW377676, AW352170, AW177731, AW178907, AW179019, AW179024, D59373, D80247, AW177505, AW179020, AW360841, AW178909, AW177456, AW179329, AW178980, AW177733, AW378528, AW178908, AW178754, AW179018, AW352174, Z21582, AW360834, D51103, AW179004, AW179012, C06015, AW178914, AW378525, AW367967, D80157, AW177722, D51759, AW177728, AW179009, AA285331, AW178774, AW178911, D51097, AW378543, AW352163, D58101, D80064, D58246, D80014, D59503, AW178983, AW352120, AW178781, T48593, AI535850, AW177723, T11417, D59653, AA809122, AW177508, D45260, D59317, C14975, AW378533, AW367950, F13647, D81111, H67854, C03092, C14227, H67866, AI557774, AI525923, AW177497, T02974, AI557751, AW178986, T03116, C14298, D45273, D52291, AW177734, D59474, AI525917, AI525227, D59695, D60010, C14973, AI535961, C14344, C14407, AI535686, C14957, D51221, D59551, AI525920, AA514184, AI525242, D60214, T03048, C14046, AI525912, AI525235, C16955, AI525925, AI525222, D80168,

					AW378542, AW378539, AI525215, AI525237, C05763, Z33452, AI525928, AW360855, T02868, D51213, D31458, H67858, AR018138, AJ132110, A84916, A62300, A62298, AR008278, AF058696, AB028859, X67155, Y17188, D26022, A25909, A67220, D89785, A78862, D34614, D88547, I82448, Y12724, X82626, AR025207, AR016808, A82595, AR060385, A94995, AB002449, AR008443, AB012117, I50126, I50132, I50128, I50133, AR066488, AR016514, AR060138, A45456, A26615, AR052274, A85396, AR066482, A44171, A85477, I19525, A86792, Y09669, A43192, A43190, AR038669, AR066490, U87250, AR066487, X93549, I14842, A30438, I18367, D88507, AR054175, D50010, Y17187, A63261, AR008277, AR008281, AR008408, AR062872, A70867, AR016691, AR016690, U46128, D13509, I79511, A64136, A68321, AR060133, X68127, AF135125, U79457, AF123263, AB023656, AR032065, AB033111, X93535, and AR008382.
HKADO36	209	1189002	1 - 1364	15 - 1378	AI886975, AJ011372, AC001644, and AC002325.
HFXKG51	210	956596	1 - 1114	15 - 1128	R29445, AA585101, AA585476, Z28355, Z30131, T11028, D57491, AI546999, D57186, AI541365, T18597, AI541374, C16300, AI525431, AI546945, R28735, R45895, AI525306, AA585098, AI525556, AI541523, AI547006, R29218, D55233, AI557262, R28892, AA283326, AI526184, D61254, AI546875, AA170832, AI540967, Z32822, R28895, R28967, R28965, AI557734, AI541535, C15406, AI547039, AI557763, D60765, C16305, R29177, AA585439, AI557787, AI526194, AI541205, D61185, AI526140, AI557740, AI546891, C16293, C15069, AA585329, AI541307, AI526073, AI557731, AA585325, AI541514, AI541013, AI557727, AI557807, AI541346, AI541517, D60844, D59436, AI546996, AI547250, AI557864, AI557084, AI525316, R29172, AI557408, AA174170, AL043444, AL044125, AI541356, T41289, AA585453, AI541510, D53472, C15737, AI546971, AI556967, AI526176, AI525500, AI541345, AI546921, AI546828, AI525320, AL041347, AL044529, AI540974, R29179, AI526180, AI557602, C14723, R29262, AJ239433, AL041233, AI557808, AL041296, AI526195, AL041086, AL043496, AI541390, AL044162, D54897, C15120, AI546829, D53161, AI526113, D59751,

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HFPHR82	211	1187749	1 - 1597	15 - 1611	AA913364, AW027373, AW305275, AI799031, AW117480, AA588138, AA775450, AW190848, AA411334, AA866178, W61038, AA411335, AA775769, AA769134, AA075643, N30274, AA627544, AI493881, AI147666, AA075644, AA614747, N30309, AA812101, AI025647, AA868924, AW339918, AI140386, N94919, AI143201, AI347094, AI138196, AA284960, AI933338, AI343592, AI128292, AI017993, AI492556, N20511, N41996, N42630, W72001, W69402, AI554835, AI679099, AA040263, T32745, AA872581, N29505, AI354734, AI268560, AI017992, F28362, AA448442, AI679673, AA863176, AA719956, AA444022, AI142803, AA732322, AI304774, AI475118, AA993672, AI624135, AA846235, W44314, W44778, W37097, AA682603,

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HISAF59	212	959140	1 - 899	15 - 913	AW401787, AI394630, AI418298, AW375742, T30407, Z44281, F07299, R25015, T32685, AA974700, F07734, AA297059, AW239548, AA897415, R45025, AI807678, AI343378, AW206793, AW138409, AW163027, AI815476, AA503315, AA047793, AW137324, AW140018, AI936871, AI015047, AI017077, AI168175, AI302185, AI025217, F03423, R46686, AI073417, Z40806, AA026054, AW002416, AI652375, F03562, T03397, AI983297, H42881, T82311, AI025310, AI831833, R08769, AI911100, AA471062, AW157059, AA382959, H22172, AI356604, AI537006, AI825970, AW338394, AW192088, AI559159, AA593826, AW078709, and Z61277.
HCEHD66	213	1136122	1 - 926	15 - 940	AI968437, AI824971, AW104052, AI762197, AI598138, AI088543, AW135225, AI827280, AW007187, AI391466, AA534403, AW028554, AI492390, AI369729, AA135928, AA507443, AW137272, AW381735, AW006062, AW138526, W81153, AA918755, AA085774, AA058923, C03738, R85039, AI937792, AI867512, N62215, AI864402, N62216, D44882, H14329, H40979, AI808139, AA463408,



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HE8UY74	214	1163590	1 - 591	15 - 605	N23547, H06088, Z24919, AA010516, R94366, AA004981, AA304780, AA343256, and N31310.
HAHIY08	215	962113	1 - 265	15 - 279	AA100160, AA307684, AA244505, R57782, AA864846, AR044133, and AR044123.
H2CBH45	216	1128919	1 - 983	15 - 997	AA307462, H86407, AA019170, AW351511, AA036880, AA045560, D89677, and AL133047.
HMVAM09	217	1194828	1 - 1835	15 - 1849	AI685410, AA873182, AI969804, N21495, AA708519, AA581446, AA035001, AI088511, N20223, AA101798, AA534317, AA397365, AA621392, AA397470, AI343916, AA035462, AI682643, AA397454, AA565111, AI096942, N68558, AA101799, AW029215, AI802673, AI130817, N73321, AA470951, AA470484, AI302901, N29290, AW024919, AA358533, AW135812, AI376856, AA740383, AA349063, AW051031, and AI276887.
HFPEN04	218	1199663	1 - 2090	15 - 2104	AI631883, AI767614, AA018867, AA019175, R56792, AI497937, N95592, R44001, AW271411, R56793, Z38315, and Z42023.
HSLJD02	219	1104452	1 - 965	15 - 979	AI905856, AW178893, T03269, D80164, D58283, D59859, D80022, D80166, D80195, D80193, D59927, D51423, D59619, D80210, D51799, D80391, D59275, D80240, D80253, D80043, D59787, D80227, D59502, AW177440, D59467, D81030, AW179328, D80212, D51060, D80196, D80188, D80219, C14014, C14331, D80038, D80269, D80366, D57483, C15076, AW178775, D50979, D50995, D59889, AW360811, D80134, C14389, AW366296, AW375405, D80045, AW378532, D51097, AA305409, AW177501, AW177511, AW178762, AW377671, D51022, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, AW352170, AW367967, D58253, D81026, AW178980, AA305578, AW377676, AW352171, AW177731, AW178907, AW178906, D80248, D80132, AW179019, AW179024, D80522, D80133, AA514186, AA514188, AW179329, AW378528, D80247, D80439, T48593, D89785, D34614, X67155, AR018138, D88547, X82626, A84916, A67220, A62300, A62298, Y17188, A78862, D26022, AJ132110, A25909, AB012117, AR025207, A85396, A44171, I19525, A85477, AR066482, A86792,

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HDPFZ30	220	1220164	1 - 1683	15 - 1697	AA582196, AI690196, AW207633, AI417381, AI494563, H15131, AI220943, AI963799, AW055140, AI680222, N54913, AW008673, AI000592, H04038, AA385773, H03355, AW374840, AI014381, H15190, Z41172, AW374989, F08100, AA348883, N88565, AI924734, T03532, and AA348882.
HPJCR33	221	1217931	1 - 2404	15 - 2418	AA630312, AA399309, AI566447, W45583, AA148064, AI379707, AI041054, AA478756, AI581333, AI745305, AA253311, AA947298, AI744665, AA545782, AA194036, AA479976, R61402, AW297108, AI083947, AA398243, AA235081, AI700620, AI458557, W45546, AI433426, AI092537, AA195635, Z46141, H15959, AA235210, AA743383, AI656322, AA015701, AA766679, R23558, AI702152, AI370616, R61360, AI038624, AA018978, Z41774, R60379, AI535639, R14628, R68398, R31614, H01672, AA585439, Z28355, M85798, R31659, AA585101, R45613, Z30131, N87140, AI525556, AI546999, AI541365, AI525306, R68600, AI557731, AA585453, AI525431, AI535660, AI536138, AI547039, AI526194, AI540967, AI546855, AI541535, AI557807, T11028, AI557262, AI541374, AI541514, AI556967, AI526140, AI541510, R29445, D61254, AI525316, AI541523, H01673, AI546828, R28735, AI541013, AI557787, AA585440, D57491, AA585434, AL041159, AI541509, R32345, AA585476, AL041142, AL041238, AL041133, AL047183, AL040322, AL041131, AL046330, AL041051, AL041292, AL040119, AL047036, AL047170, AL047057, AL047219, AL041227, AL040463, AL039915, AL043612, AL045817, AL041197, AL040155, AL041346, AL040529, AL041096, AL047012, AL041358, AL041277, AL041163, AL041098, AL040621, AL043538, AL041324, AL040464, AL044162, AL041086, AL043496, AL041296, AL041233, AL041278, AL045725, AL041140, T23985, AL040193, AL040625, AI541534, AL040510, C16300, AL043467, AL044186, AL040553, AL038761, AL044037,

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HTOAK34	222	1081321	1 - 827	15 - 841	AA491322, AA505126, and AW408167.
HE8NI24	223	971296	1 - 737	15 - 751	AA883367, AA332611, AA732890, AI283442, AI673342, AI631153, AI200800, AI910962, T11417, D80258, D59503, D80014, D81111, C14227, D80064, AI557751, D58246, C06015, AA514184, AI535959, AW178893, AW178907, AW375405, AW177440, AI535686, AW360834, AW178908, AW360811, D80314, AA809122, D80251, D80253, C03092, D80247, D80043, AA285331, AW176467, C14389, AW179328, T48593, AW375406, D80439, AW378534, AW179332, D58283, AW377672, AW179023, AW178905, D59859, D80022, C14331, D80166, AW177731, D80195, AA305578, D80193, D59927, T03269, D59467, D51423, D59619, AW378528, D80210, AW178906, D51799, D80391, D80164, D59275, AW178762, D80240, D80038, AW179019, D59787, D80227, AW378533, D59502, AA305409, AW378532, F13647, D45260, AW178914, AW378542, AW360855, AW377676, I50126, I50132, I50128,

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HAMFM39	224	1055532	1 - 4620	15 - 4634	AI660231, AI304355, AI745391, AI951619, AI814592, AI467782, AI274105, AA426190, AW301083, AI375593, AI922346, AI829867, AW136366, AA227834, AW105735, AI304726, AW194167, AW297557, AI971865, AA151872, AI985643, AA757072, AW028756, AI202419, AI346603, AW295401, AW176248, AI659079, AA149658, AA425159, AI870033, AW194075, AA233413, AW102818, AI765117, R61588, AA365664, AA365663, AA601170, R61532, AA357346, and AA551861.
HBGMG39	225	1126283	1 - 343	15 - 357	AI497641, AW069135, AI623708, AW084071, AW339039, AI569972, AL036585, AW192429, AI458409, AI379125, AI066465, AW003414, AI742565, AI740930, AI743686, AI168481, AI991329, AI061450, AW007899, AW102701, AI342244, AI609020, AI453165, AI248142, AW044270, AI761292, AI693756, AI870883, AI129686, AI992036, AW057507, AW151858, AI362058, AI475537, AI864435, AI479128, AI378430, AW008808, AI080156, AW191953, AW080685, AI627434, AI369151, AI926062, AI963067, AI923881, AI740972, AL045227, AI351617, AI334039, AI452903, AI700412, AI469546, AI187911, AI066744, AA551905, AW132118, AI190677, AI812069, AI081231, AI050026, AA577674, AI890929, AI096904, AI554840, AW073739, AW190499, AW250073, AI524714, AI884727, AW168902, AI858574, AI422058, AA304774, AI890721, AI052823, AI683215, AA682804, AI087154, AW004991, AI640737, AA461453, AI668789, AA532435, AA912478, AW079985, AA054275, AA970861, AI819302, AW085591, AA010790, AI017023, AI217784,

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HSXBV89	226	1128699	1 - 2233	15 - 2247	<p>Z99410, AW373793, AA553665, AI190674, AI366341, AI184600, AW004692, H10539, AA482462, R45646, AI521134, AA973962, R42556, AA720003, H11452, AA211375, R22747, AW009222, AA417872, AA632195, W39346, R52677, R61178, AA720022, R61892, T80548, R20364, H46470, F07364, R86859, R55930, Z41453, AI360146, R87776, H08592, AA483558, W38313, R55720, R43749, T30657, AA426408, H95699, AA363950, R18352, R15260, R18538, R87830, F05821, R87766, R10214, R90750, T15918, F03602, T34747, H95698, W84692, R87845, T78493, F08462, T16643, AA210976, R13935, R25677, H50912, AA349344, AI302317, Z99411, F07877, AA643729, R52724, R43750, AA522619, F02068, R43495, R41527, H52035, AI092517, AI291295, AI570476, AI951902, AI906668, AI906666, H38986, AI553790, AW268395, AI312547, AW450243, AI681390, AI344432, AI343814, N44903, W84640, AA614791, AJ245820, AJ245821, AJ245822, and</p>

					AF131749.
HBIOZ10	227	1143756	1 - 559	15 - 573	
HTLEJ11	228	1085651	1 - 956	15 - 970	M62294.
HAWAM69	229	1207835	1 - 2944	15 - 2958	AW385785, AA430300, AA541688, AA776700, AA679037, AA573270, AA126614, AL045796, AI268236, AA682186, AI963606, AI926591, AW192904, AI924827, AI922590, AI032288, AI375804, AA705172, AW081541, AA694514, AI130883, AI800450, AA931725, N25288, AI270687, AI366906, AW058362, AI683319, AA436891, R59176, AI597744, AI446542, W69578, AW453004, AI911821, AI095665, AA687634, AI130013, W69579, R59232, AA722782, AI587015, AI191864, AA398533, AA676733, AI476374, AA115447, AA554327, AA759328, AW242281, AI139766, AA042956, AA886732, AA664356, AA358590, AA135916, AI565897, AW304844, AA618576, AA916086, R66162, H71919, AA363371, AA430199, AI370031, Z44808, AA320329, AI934183, AA393105, AI004140, AA135927, AA042816, AW452852, AA135926, H44791, AA813424, AI865731, T35731, R42647, R27785, T32691, AI857286, AW008428, AI631988, AA115446, AA678468, AW075384, AI569918, H44790, AI918635, AA601518, AA603858, H42641, AI745618, AI445766, R27874, AI939990, AA677131, AW364938, AI569374, AW029062, AL042382, AL119511, AL119457, AL042544, AL119399, AL079794, C01947, AL043152, AI863382, AL043168, AL119324, AI670009, AI698391, AL036403, AI358701, AI909661, AL046944, AL037454, N42321, AW082113, AI886124, AI590120, AI978703, AI525669, AW167228, AI525653, AI254727, AI637584, AI783504, AL079963, AI557808, AL119863, AI609409, AA127565, AW020397, AI247193, AI889189, AL039086, AI866608, AI590686, AL045500, AL121306, AI612885, AI364788, AI433157, AI702073, AI888661, AW238730, AL043975, AI541027, AI633125, AI610357, AI673278, AL079741, AL121328, AW022682, AL045997, AI859991, AI686906, AI923989, AI621341, AI269862, AL042745, AI620284, AI915291, AW020419, AI340519, AW023338, AI522052, AI874166, AI866770, AI679550, AI284509, AI541056, AI801793, AW163464,

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HCKD11	230	1056288	1 - 3714	15 - 3728	<p>AL037558, AA417129, AW021717, AL042365, AI440238, AI885989, AA641818, AI378123, AW088560, AI648699, AI673278, AI572717, AI559752, AW023338, AI280732, AW238730, AI538885, AI866608, AA805434, AI923989, AI249877, AW022636, AI697324, AL118781, AL120995, AA514684, AI349226, AL048323, AL079963, AI929108, AL048340, AI697420, AI784252, AI318280, AW151714, AI811192, AW022102, AW161098, AI565031, AW029457, AI471429, AI862880, AW163834, AI536836, AI950729, AI582932, AI521594, AW088903, AI862144, AI954183, AI288285, AL037592, AW118448, AI348777, AI335426, AW082532, AI537677, AI611743, AW166742, AW161579, AI567971, AI954422, AI633125, AI925404, AI809062, AI860027, AI815232, AW152182, N22276, AW162194, AI538716, AI345688, AW366372, AI334893, AI440260,</p>

				AI241678, AI335214, AI493836, AI499285, AL041220, AI432644, AI798456, AI702091, AW021189, AW073697, AW083573, AI537261, AW089840, AI252023, AI586931, AW151132, F26535, AW020480, AL047344, AI340603, AI963668, AW161402, AI589004, AI473208, AI524654, AI621341, AW104141, AI338427, AI287233, AI349246, AA908294, AA420722, AI886123, AI623941, AI340519, AI690813, AW170787, AI254042, AI627714, AW051088, AW020381, AI680165, AI473536, AW020397, AI240978, AW079432, AI365256, AL036923, AI269862, AI635016, AL038605, AI368579, AI623736, AI500061, AI699020, AW129456, AW087336, AI289791, AI138480, AI567351, AW029216, AI927233, AW059828, AI866465, R39624, AI969641, AI589428, AW022699, AI915291, AW020419, AI470651, AL048496, AW169234, AI421328, AI587606, AI439452, AI539771, AW169604, AI540674, AI745329, AI282652, AW054931, AW020561, AI538829, AI887163, AI525653, AW129202, AI969655, AI610086, AI348854, AL121270, AI523806, AI432532, AI282930, AA602414, AW090768, H89138, AI873644, AW189473, AW162189, AI536601, AW079706, AW148356, AI345415, AI355779, AW074605, AI254420, AL110306, AI625467, AL045349, AA806719, AA833760, AI620056, AI591101, AW118237, AA736984, AI680280, AI538764, F27788, AA503384, AI623396, AW078895, AI868831, AL135024, AI758924, AA829061, W45039, AI472487, AI434223, AI289436, AI962858, AI673363, AW129230, AW194014, AW022300, AL039086, AL043981, AW090103, AI890907, AW025464, AW103628, AI554821, H43387, AW029186, AI499325, AW080766, AA808175, AL046942, AW090492, AI698391, AI863479, AI612885, AW087200, AI921244, AI804531, AA001397, AI340627, AL036705, AI677796, AW079572, AI696358, AI247293, AI452560, AW019985, AI620287, AI246319, AA764968, AJ243342, I72363, U12336, S53987, M30514, AL050116, AL137256, AL133080, I89934, AC005291, A65340, AF017437, AF200464, AF058921,
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HDPLT62	231	1027241	1 - 2693	15 - 2707	AI279417, AL079734, AA502991, AA410788, AI755214, AA643770, AW023111, AI754105, AI754567, AI805363, AW328331, AA632765, AL042373, AI254779, AA704393, AI962030, AA659832, AA507042, AI253376, AI380617, AI923052, AA524229, AA904275, AI460050, AA714110, AI345695, AL119247, N23913, AA572813, AW008169, AA470933, H45698, AA169245, AA477503, AA829036, AA535216, AA452887, AA809546, T71936, AI311647, AI278972, AI783911, AI674840, AW409710, AA581247, AI620585, AI754767,

				AA524616, AI114733, AI677655, AW265688, AI133552, AA618316, AI627614, AI491765, AW419389, AI053696, AA632993, AA601394, AI056046, T07225, AI270602, AA837686, AL120343, AW083934, AL135108, AW193493, AA714288, T74524, AI912401, AA228778, AI921765, R99034, AL041894, AI242011, Y18994, D50671, AP000031, AF053356, AC006333, AP000252, AL008718, AC004858, AC004999, AL049757, AL121653, AC006538, AC006449, Z82172, AC005751, AC005480, AB023049, U80017, U62293, AL049759, AL049830, Z81369, AC020663, AL034548, AC005057, AL096701, AC000004, Z95114, AL079295, U91326, AL035086, AL021977, AC002350, AC010582, U63721, AL023655, AL023553, AC005821, AP000134, AP000212, AP000116, AC004991, AC000353, AB003151, AC005031, AL031295, AC010205, AC005736, AL139054, AL133245, AC006480, AC005288, AF130343, AL022238, AC006057, AC004895, AC005363, AC007637, AP000304, AC005274, L11910, Z95118, AC005725, AF111168, AC007707, AC007041, AL031662, AC007216, AC004148, AF064858, AL031311, AC003042, AC005695, AC007688, Z97205, AC007283, AL031005, AC005104, AC005678, AF109907, AC005777, AC003007, AC007371, AP000688, AC006088, AC007450, AC003957, AL034420, AC006537, AL096791, AC009516, AL031276, Z99716, AC004905, AL049713, AL022723, U91318, AF001550, AC004859, AC004598, AC007774, AL021154, AC005037, AC007899, AC005067, AC005046, AC000118, AL132712, AL031770, AC005332, Z86061, Z98946, AL049776, AC005779, AP000044, AP000112, AL031779, AP000513, AC005365, AC004655, AC005291, AL135744, AL008582, AC004755, AC006344, AL022316, AP000344, AC006084, AC004408, AL080317, AC007686, AC006285, AL078638, AC004025, Z83840, AF196969, AC007731, AC005619, AC006199, AC004771, AL031281, AC004797, AC016025, AC006046, AF001549, AC007014, AC000026, AL121652, AC002352, AC000062, AC002431, AL020997, AC005041, AL132994, AJ246003,
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HTPFX16	232	974296	1 - 470	15 - 484	
HE9NO66	233	1079624	1 - 976	15 - 990	AI732997, AA865818, AA977633, Z69734, AB035267, AB020741, and Z68339.
HSDJI44	234	1154068	1 - 2093	15 - 2107	A38246, A11524, AR029497, E05333, and E00893.
HFXDP53	235	1126294	1 - 1567	15 - 1581	AR001481.
HWADY66	236	734565	1 - 490	15 - 504	AA923698, AI673803, AI302688, AF191838, AR016417, AF145705, AF191839, and AC000025.
HLDBC63	237	1144557	1 - 859	15 - 873	AW374344, AI424750, H12370, R32561, H12318, R28631, AI638545, AI760745, L39211, L07736, U88294, and Z56143.
HFIVB68	238	978211	1 - 823	15 - 837	AA332003, AB033033, AF182316, AF182317, and AL096713.
HTLAC56	239	1181355	1 - 836	15 - 850	AA614273, AA149526, AA722818, AA151569, AI299133, AI150935, AA542982, AI360422, AI079938, AA603610, AA716009, AI751611, W79786, AI083848, M78943, H40867, T31238, AA662256, AA298393, AA297499, AA541718, W79587, and AI074815.
HSSAD41	240	753094	1 - 566	15 - 580	AA149526, AA151569, AA722818, AA614273, AI299133, AI150935, AA542982, AI360422, AI079938, AA716009, AI751611, W79786, AI083848, H40867, M78943, AA603610, T31238, AA662256, W79587, AA541718, and AA298393.
HCFMT57	241	1218436	1 - 2155	15 - 2169	AI452994, AW370315, AI333235, AI983346, AI811889, AA598963, AW370305, D81728, D81129, AA344996,

					R14748, AI699873, AC004687, AB014512, and AF039571.
HDAAV61	242	1188787	1 - 1319	15 - 1333	AA314786, AA160847, AA158845, AA157440, AA083972, AA159380, AI762433, AW404501, AI191825, AW105372, AW386309, AA157878, AI140935, AI922109, AW386330, AA442139, AA159268, AA083866, AW390887, AA100183, AW390888, AA262414, AA041219, AA488548, AA158846, AA158270, AI187149, AW076076, AI167533, AA743207, AA837990, AA442140, AA488413, AF125532, Y11092, AL137565, AC007136, and Z25424.
HDPKD75	243	1096253	1 - 623	15 - 637	AA923698, AL040000, Z21326, AR016417, AF191838, AF191839, and AF145705.
HTEON29	244	1126312	1 - 538	15 - 552	AW004028, AA432290, AI968030, AW237673, AW138422, AA428635, and AA861634.
HSKAC24	245	1121800	1 - 497	15 - 511	AF170301, AF170302, AF077659, and AF144573.
HTJAA71	246	1216498	1 - 1721	15 - 1735	AW238721, AW265324, AW238371, AW238695, AW238323, AW084388, AF077831, and AF185276.
HTEKS20	247	1124378	1 - 1061	15 - 1075	AI936596, AA868353, AI797296, AA725553, AI221970, AI073397, AA428462, AA429551, AA431190, AA629305, AA629047, AW235895, AI123443, AI808267, AA609412, AI914363, AA953895, AI214385, AA431516, AA911681, AA781953, AI825106, AA298758, AI215028, AA909534, AA723768, D10393, and S63991.
HE9TK49	248	1125192	1 - 1353	15 - 1367	AA086273, AF126965, AF126966, AC004590, AF124351, AB012043, AF134985, AF134986, AF125161, AF027984, and AJ012569.
HCHAT01	249	1202275	1 - 2977	15 - 2991	AL079756, W80383, AA570709, AA746031, AA316540, N24219, W78982, AA740804, M78765, AA985314, AW337818, AA348323, H23489, W01009, AW273022, F10250, AW050885, H30484, AI494441, AA732761, N41828, Z41805, D51145, AL041943, AW079303, Z46179, H20834, H12176, H90615, AA641974, N28433, N45481, T31584, F12634, AA342119, R43266, AW365055, AA459071, AA464017, AA464078, R43775, T78049, T31949, AA046221, AA477480, AW139948, AW372243, AA143521, AW372245, R17167, AI655751, AA496370, R43146, T31978, AA496647, R25017, AA348324, H46223, T35092, AW071171, AA150812, AI085437, N99421, AA342120, AA131786,

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HCEEN06	250	1150867	1 - 752	15 - 766	AW249673, AI568057, AI762163, AW300914, AI760528, AI341537, AI685427, AI572091, AI560209, AI453713, AI025000, AI761048, AI972204, AW170258, AW009963, AA864405, AI343959, AI912498, AI079913, AI559574, AI418784, AI438969, AI559101, AI973222, AI660152, AW016547, AI986363, AA806938, AI656111, AW003957, AI018296, AW028203, AI652597, R52151, H27175, D20315, H27174, and H77974.
HDPK183	251	883382	1 - 781	15 - 795	AA287508, W15561, N80792, AA922507, and AF159356.
HSPBQ12	252	1152258	1 - 1130	15 - 1144	W02910, AA282287, N72351, AA829957, AW205583, AW408526, AA282483, W86878, AA249705, R97467, AI090365, AB014536, and AF077226.
HPCID78	253	886915	1 - 793	15 - 807	
HDTKQ14	254	886936	1 - 541	15 - 555	AL023653, AL049683, AL359542, AL359542, and AL359542.
HRACK83	255	888037	1 - 566	15 - 580	AC005832.
HSIAO78	256	1156438	1 - 1990	15 - 2004	AA527435, AW195324, AI653000, AW051613, AA514619, AI652532, AI675204, AA435717, AI796596, AI273289, AI659333, AI880669, AI826786, AA889355, AI174916, AW004627, AA377072, AA255838, AA397980, AA430523, AI565825, AI435476, AW001866, N52904, AA430608, AI760594, AA298640, W69756, AA594479, AI149418, AI911011, AI871818, N71537, AI089421, AA400874, AI038591, AA854839, AW044396, AI565867, AI131012, AI144119, H65663, N47230, AI732273, AW079534, AA847967, AW027678, AL044698, AA224892, T36269, AA009702, AI668849, AW182206, AA011130, N78511, AI676028, AA968449, AI984040, AA207018, AA658246, N73670, AI937659, R53598, AA453038, AA904224, AW293549, R48261, AA775033, H52314, R38289, H48428, AW083969, AA588654, F10880, AA578060, AW298073, W25831, AA889378, AA483944, AC002302, X62260, AC002288, AL035588, AC007425, AC004216, AF181896, AP000280, AP000038, AP000107, AF003528, AL033525, AC009498, AC007676, AC006080, AC005704, AL022328, AL118497, AC005332, AC007221, AL132987, AC005011, AC004874, U69570, Z48484, AB020858, AC004382, AC005213, AL049753, AC005771, AC004894, AC006023,

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HWAGS73	257	894404	1 - 587	15 - 601	AF156884, AL096870, and AL096870.
HCMSL08	258	898203	1 - 1740	15 - 1754	AI141895, AI201842, AI351867, AA251985, AA197256, F20444, AA194198, AI800873, F36894, F26457, AA482914, AA197255, AA482932,



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HLWFN63	259	1101533	1 - 3089	15 - 3103	AA707313, AI880426, AI684827, AI744551, AI307796, AA101249, AI284152, AA007399, N98643, AI375268, N66095, R71685, R02817, AA085724, AI221876, AI061056, AW207571, AA111956, AI460369, AI333887, AA594062, R18624, R62793, W22434, AW007868, AA776586, T70023, R71720, H70803, AA101290, AA323135, AA029721, AA320669, AI193496, R07828, AA007478, AI915644, AI932703, T69946, R62792, AA029660, AI859215, AA205667, AI625446, AI273982, AB018333, and AC006599.
HPWAY10	260	1128033	1 - 1154	15 - 1168	AI027613, AA332875, AW367440, AW376896, AA330257, AL042522, AW367550, AW304212, H80390, AA447076, AI923485, AW316546, R08512, AB023178, Z30174, AC007676, AC007842, AC004696, AC005498, AB021641, and X78933.
HOUDH19	261	1153909	1 - 392	15 - 406	AW207457, AI084622, AI392839, AA628082, AA534387, AW243188, AW129204, AI695812, AI572814, AI948743, AA651748, AA301865, AW371758, AC007842, and AC005614.
HDPFF24	262	1194719	1 - 1774	15 - 1788	AI279875, AW369718, AI800428, AI566117, AA446945, AI246362, AA565728, AI436697, AA443369, AI761945, AW237445, AI889318, N66534, AW103788, N52334, AW302153, AW131719, AA588564, AA261806, H56725, AA199832, AA287107, AW419044, AI015242, AI807571, T80574, AI929099, N75104, AI269178, AA207149, AA912487, AA086082, AA780112, AI928828, R38930, AW450464, AA766626, AI904377, AA086081, AA365879, N88094, R68759, AA662606, AA281290, AA577126, R58834, H67457, D58175, N87549, H56648, T03486, AA261992, N28632, and AI913676.
HWLFH94	263	1152278	1 - 1268	15 - 1282	AI339104, AA861042, AA134985, AA868144, AA134946, AI626100, AA922724, AA535447, AA308766, AA056635, D25742, AA916634, AA551763, AA873574, AW192836, and AR044148.
HWMBM1 3	264	1152283	1 - 879	15 - 893	AI339104, AA861042, AA134985, AA868144, AA134946, AI626100,

					AA922724, AA535447, AA056635, AA308766, D25742, AA916634, AA551763, AA873574, AW192836, and AR044148.
HFIUE75	265	1172525	1 - 1596	15 - 1610	AA745592, AW408392, AA780791, AI680317, AA205127, R06019, AW074511, T76970, T86065, AI709216, T77135, R05922, T85884, R77022, AA730855, C14389, C15076, R65976, D81026, D59467, D80164, D81030, D59787, D80166, D59619, D59502, D80210, D80240, D80212, D80219, D80188, D80022, D59859, D51423, C14331, D51799, D80253, D80043, D59610, D58283, D80195, D80391, D59275, D80227, D57483, D80366, D80193, D80196, D59889, D59927, AA305409, D80241, D50995, D80251, D80269, D80038, D50979, D80522, C14429, D80024, AW177440, D51022, D80045, AA305578, D51060, D80378, C14014, AW378532, T03269, C75259, AW178893, D80248, T11417, D80133, AW179328, AA514188, AA514186, AW377671, D80134, D80268, AW177501, D51250, AW177511, C05695, AW360811, AW178762, D58253, AW369651, C14077, AW352158, AW178775, D59373, AW176467, AW375405, AW352117, AI910186, F13647, D80439, D80132, D80247, AW366296, AW360844, AW360817, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, D81111, AW378540, C06015, D51213, D80302, AW352171, AW377676, AW178906, AW352170, AW177731, AW178907, AW179019, AW179024, AW360834, AI905856, AW177505, AW360841, Z21582, AW179020, AW178909, D80157, AW177456, AW179329, AW178980, AW177733, AW378528, AW178908, AW178754, AW179018, D80014, AW352174, C14227, AW179004, AW179012, AW178914, AW378525, D59627, D51103, D51759, AW177722, AW177728, T02974, AW179009, AW367967, D59503, AW178774, AW178911, AW378543, D58246, AW352163, D51097, D80258, D59653, AW352120, AA285331, AW178983, D58101, AW178781, T48593, D80064, AW177723, D45260, D80168, H67854, C03092, AI557774, AW177508, C14975, AI535850, D80949, AW367950, D51079, H67866, AW378533, C14407, AA809122, AI525917, C14344, AI525923, AW178986, AW177497, D51221, AI535961, T03116, D80228, AW177734,

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HNTCP13	266	1182313	1 - 2243	15 - 2257	AA463847, AI479379, AW273740, AI740675, AI922082, AW009462, AI014722, AA463334, AI073540, N95224, AA007373, AI190238, AI798079, AA476563, AA670286, H02882, N92851, AA652716, H45475, W25554, AA774170, AW016339, H45576, AI370125, H03781, AW119159, AI811794, H20952, AA853882, AA853883, AI471060, AW382128, AW371996, W21053, H20991, AA368628, AW138258, AA476448, AA876335, AA788825, AF037447, and AC004486.
HBIBQ89	267	1175111	1 - 2849	15 - 2863	AA496424, AW296705, AA292435, AA768388, AI359369, AA136659, AA435941, AW192609, AI361569, N62073, AA136739, AA411140, AI940074, AA101178, H09588, AA419044, AI358988, AA399613, AA323662, AL118665, AI268044, AA436039, H09587, AA627787, N55651, AA325534, T15506, AA082253, AA423798, AA904377, Z41610, R19206, F01655, F11248, R44468, C00466, Z42117, N77119, F08911, AA767800, AI418714, F05395, T35421, and AB007925.
HWBEG18	268	1169125	1 - 448	15 - 462	AI114866, AI500518, AW327796, AW328350, AI755116, AW328609, AW410322, AW409642, AI754439, AW409590, AI754460, AI287514, AA551550, AA483482, AW205951, AA535393, AI201181, AI699829,

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HTAHB43	269	1221956	1 - 2344	15 - 2358	R53155, AW374891, AA029227, AA010232, AA149376, AA077657, AA077229, AA077669, AA076731, AW405369, AW386712, AW386708, AA077893, AF139794, AA077980, AA077825, AA078429, AI768799, AI912020, AA077544, AI738591, AA076983, AA076893, AI125178, F01048, AW373785, AI963990, AB011110, AC004084, and AC004985.
HSYBX32	270	909846	1 - 216	15 - 230	AA078429, AC004084, AB011110, AC004951, AC004951, AC004951, AC004084, AC004084, and AC004084.
HCEHE35	271	1124531	1 - 537	15 - 551	AB019692.
HFCBB56	272	1204971	1 - 2144	15 - 2158	AA547979, AI696793, AA847499, AI889995, AI279417, AA669155, AA833875, AA833896, AL036909, AW162288, AW237905, AA862183, AA019542, AW408767, AA491955, AA904211, AW265688, AI366555, AI620992, AI251034, AI250552, AI284543, AW303098, AI251203, F13749, AW407889, AW026305, AI251284, AI421950, AI628922, AA831426, AA916430, AA828834, AA339423, AI493583, AL038606, AA614214, AI223626, AI224619, AW005974, AI492579, AA572983, AL047247, AA864271, AA053463, AL042667, AL042670, T57767, AI254770, AW316599, AA600202, AA832016, AA565232, AI278372, AI791185, AI753969, AL022316, Z84469, AC007934, AC000025, AL122020, AF015262,

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HAMFL82	273	910074	1 - 489	15 - 503	T78839, and AB029015.
HBXCM38	274	1174533	1 - 2161	15 - 2175	AI752485, AI804792, AI439106, AI971133, AI991958, AI752484, AI432296, AI478420, AW082819, AI912373, R89026, AI554161, AA894797, AI752414, H13307, AI249165, R61527, N62403, R89727, N47856, AI689339, R61583, AI368569, AI984780, H44175, AA219502, T32963, AI802627, AI752415, AW295386, AA985168, H06745, R40750, M79099, AA203312, R00511, A91842, A91846, A91844, and A91848.
HLHCR16	275	910123	1 - 3790	15 - 3804	AA402528, AI379350, AA716107, AI123557, AI127175, AA234106, AA234698, AI039768, N77999, AI580137, AA424560, AA419490, AI334141, R71349, AI224976, AI417798, AI080508, N58410, AI818475, AA424657, N91089, AA399612, AI144265, AA399137, AI498363, AA410986, AA235306, AA399148, AW292497, AI249102, W86869, AA115407, H81257, AI077499, H00194, H45499, R01206, AW104245, AA234880, AA367417, AA852175, F05822, AA853077, AA852176, R82875, H81245, AA298421, R71350, R22096, H81585, AI985171, T49265, H81591, AA115408, R64037, T54283, AI492930, AI492932, R82876, R81695, R33935, R34138, R25630, H81595, R32025, R81696, T49264, R95688, R01319, R22040, Z21579, R33043, Z38741, AA514393, T97662, T34993, AA705441, D79105, R32078, H45500, AA707178, R30943, H81576, H81250, AI032721, AL079279, and I76197.

HE6GF02	276	1153883	1 - 599	15 - 613	
HOUFT36	277	1162680	1 - 1842	15 - 1856	AI190165, AI979249, AI917302, AI806483, AI633819, AI624750, AI147946, AI471728, AW196791, AI471611, AI985423, AA609421, AA256164, AA705338, N22327, AA811162, N75202, AW236751, AI922484, H79904, AA057615, H79810, AW362445, AW407702, AA542823, AF162130, AF161181, and AC005084.
HAGGF84	278	1197460	1 - 4064	15 - 4078	Z99408, AI829910, AI004608, AI263188, AI262955, AA777512, AI625727, Z99409, AI436555, AI494561, AI085959, AI540110, AA481595, AA521313, AA283109, AL135568, AA988090, AA810697, AA233122, AI933149, AI754128, AA010623, AA806759, AI818869, AA809487, AA766911, AA316038, AA010624, AI750702, AA235130, W88865, AW296786, AI537382, AI432148, AA837093, AW385431, AW190812, AI033124, AI002712, W88760, AA283596, AA234956, AW295662, AA788729, N44843, AA777583, AA554176, AA889979, AA446963, AA448956, N55182, AI374973, AA447669, AI690467, AA283023, AA233206, AI073663, N33311, W27009, AA490727, R44959, AW135448, H12918, AA683306, AW021785, N93004, AA491218, W05278, AI393402, R37684, W30935, H54295, W45465, AA865595, AA765107, AA614573, AA767313, AA009487, H17018, AA767430, AW022593, R13824, AA736921, AA282705, H54372, AL120285, H67974, F00924, W56321, AA447819, W02795, AI124777, AA665370, AA687964, F00219, R20172, AW239099, N77241, H17017, AW262494, AA449684, AA481529, T39306, AI810957, W05327, AI750703, H87993, AW263323, F02227, F05900, Z33528, N75469, AA782796, AW262536, N75534, H05503, N37017, W56241, H54503, F02057, F05985, T40514, AA009901, F05811, AA322373, AA476641, R00735, R58669, H67654, AA732599, R00734, AA766461, AI381341, AW130224, R08857, AA330053, AA400645, AA730271, R08964, N88052, T19108, AI432714, AA424457, AI051190, W21355, AW148465, AF071569, D14906, U73504, AJ252239, J05072, X63615, L07044, AC004168, AC004056, U66064, X77192, X75774, X77193, X77195, X77194, L13406, L13407, L13408, AF059029, U50361, U73738, AF067728, AC006115, AC006112, AF107018,



					Y00093, AF179633, AC005156, AL133088, AW627616, and AW630893.
HTTKP07	279	1119031	1 - 598	15 - 612	AI640500, AA035703, AF130247, and AF165138.
HE9SE62	280	1171014	1 - 706	15 - 720	AI765247, AW021430, AI822051, AI822104, AA010459, N70537, AL133567, and AB018312.
HUJAD24	281	1162674	1 - 1732	15 - 1746	AI923935, AI336906, AI333385, AI312076, AW204515, and AI203953.
HWLFG75	282	1228123	1 - 2024	15 - 2038	AI356559, AW163067, AI937030, AI652337, AW028706, AW157098, AW028808, AA004795, AA443325, AW005140, AW173645, R60229, AA442531, AI274924, AI810652, AI924004, AI572794, AI336556, AI672253, AI147260, AI872258, AI347103, AA467751, AA724594, AI280850, R52646, AA536110, H16834, AW450707, AW444512, AI376913, AA468349, AI807962, AA927875, R42625, AA609873, W28566, AI918962, AA578362, AA578062, R17389, C18386, R15375, AI016851, R60462, H16941, AI423739, AA467933, AA740299, AA025666, R42116, AA978110, AI423740, AW117517, AI886594, AA443338, AI857296, AW071349, AL048871, AL047763, AI702406, AI250293, AW117882, AI702433, AW195957, AI439087, AL119791, AI568870, AI433976, AI499463, AI538716, AI633419, AI349933, AI678302, AW274192, AI868831, AI498579, AI613017, AW162071, AI699857, AW071417, AW235035, AI540832, AI863014, AI628205, AW169653, AI249257, AW238730, AI349004, AI690835, AI224992, AI349772, AW301409, AW103371, AI866608, AL120736, AI564719, AL135661, AI866002, AI440426, AI590128, AI620284, AI275175, AI281779, AI433157, AL036146, AL036396, AI340582, AI521012, AI500077, AL040243, AI567351, AW074993, AI349645, AI500553, AW268253, AL045500, AI312152, AI345735, AI349937, AW089572, AI366549, AW068845, AI568854, AI597918, AI673256, AL038605, AI497733, AL047042, AI969601, AW148320, AI800453, AI800433, AI636456, AI635461, AL121270, AL036802, AI800411, AI682841, AL119049, AI610645, AI282655, AI597750, AI921379, AI758437, AI866887, AI432229, AI625079, AI690751, AI343112, AL036274, AI349256,

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HT3BG12	283	1092417	1 - 1050	15 - 1064	AI028599, AA774434, AA905685, AI393349, AA991810, D80022, D80268, D58283, D80043, D80166, C14389, D50995, AW360811, AW178893, C14331, T03269, AW177440, D59927, D50979, D57483, D59859, D80195, D51423, D59619, D80210, D51799, D80391, D59275, D80240, D80253, D59787, D80227, D80522, D59502, AA305409, D80164, D59467, AW178906, D81030, D81026, D51060, AW377671, AW375405, C14429, D80188, D80212, D80193, D80196, D80219, AW179328, D80247, D80038, D80269, D80366, D59889, C15076, D80024, D80439, D80248, AA514186, D80045, AW366296, D59610, AW360844, AW360817, D80378, AW375406, AW378534, AW352158, AW179332, AW377672, AW179023, AW178905, AW378532, D51022, AW378528, AW178762, C14014, AA305578, T48593, D80133, AW176467, D80302, AW369651, AW178775, AW177501, D80241, AW177511, AW177731, AW352120, AA514188, AW352171, AW377676, D51759, AW352170, AW178907, AW179019, AW179024, D51250, AW178983,

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HTLJC71	284	922923	1 - 1738	15 - 1752	<p>AL039539, AL045443, AI336919, AA406128, AA405229, AL042307, AA431504, AA311249, AW086440, AA813520, AI240644, AA897733, AW268487, AA782009, AW172455, AI301209, AI014598, AA969918, AL041043, AA431178, AL039540, AA973051, AI221826, AL133030, AC009516, AP000552, AP000556, AP000557, AL117509, AC023490, AC023490, AC009516, AC009516, AC009516, AC018751, AC018751, AC018751, AC007957, and AC007957.</p>
HCOMM05	285	1194701	1 - 1624	15 - 1638	<p>AI681802, AA534542, AL044632, AI912061, AI912050, AI298280, AI271683, AA587766, AA143726,</p>

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HSLJE54	286	1229928	1 - 2015	15 - 2029	AA224020, AI906305, AA325180, AI282479, AW237905, AL038842, AW410354, AW069227, AW327624, AW340905, AA904211, AI634187, AW162288, AW023111, AI696793, AA584489, AI278972, AA558404, AI340641, AW275432, T05834, AA640430, AI635028, AI457313, AW272294, AA225406, AI076236, AA916430, AI340832, AI284640, AI358712, AL046409, AA640410, AI891080, AI280266, AL039041, AL039042, AW276827, AI753365, AI609972, H73550, AW021917, F13749, AA742815, AI192440, H71738, AW264901, AA829065, AA557982, AW271917, AW243793, AI362442, AA704393, AW303196, AA133472, AW274349, AI560085, AI755057, AA503018, AL079869, AI587583, AA747757, AW243831, AI587565, AI890324, AA832175, T47138, AI694784, AI246796, AI628859, AI570261, AW105346, AI250552, AA557945, AW301350, AI284543, AW408767, AW157731, AW193265, AA828619,

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HTGED07	287	927411	1 - 489	15 - 503	AA565765, AA565751, AI765474, AA085796, AA988365, AI380028, AI243840, AA976164, F05393, H13329, Z78407, T78216, D82559, AI868591, AL121852, AL117355, AB020724, AF092139, and AF110646.
HOFNH30	288	928365	1 - 362	15 - 376	AF186380, and AF127138.
HWNCY05	289	1179767	1 - 968	15 - 982	W40569, AW025860, D63226, AA334307, and AC006928.
HDPDA47	290	929193	1 - 1036	15 - 1050	AW402583, AL049683, and AL023653.
HWMEV63	291	931154	1 - 440	15 - 454	D13626, and AC078816.
HCFAT25	292	1052857	1 - 626	15 - 640	AI287912, AI349658, AI792640, AF096300, AB014587, AC005035, AL137755, and U88984.
HHEQV39	293	1165420	1 - 873	15 - 887	AA355773, and AA355926.
HHFJH79	294	1228195	1 - 2303	15 - 2317	AW370568, AI684034, AI567533, AW361753, R17150, AA554360, AW245518, AW245843, AL046054, AI185853, AI814502, AI830917, AW027953, AI423947, AI761370, R77851, AW028779, AA338439, R59685, R25627, AI244276, AA587224, AI342419, AI377795, AW188290, AI361824, AI249713, AW008444, AW173497, Z45900, AA339575, AA232181, AI206821, AA142987, H11878, AA470821, AI933390, AI636179, AA317977, AA363355, AA373480, U79287, AC006942, and AL050131.
HUCOW17	295	1155190	1 - 1693	15 - 1707	AI245305, AA307147, AW139688, W52616, AA416742, AA102287, R60274, AI085546, AI167698, R60782, H17001, AI400152, H15571, D78731, AI264789, H17000, H15631, AA192581, C03464, AI571949, AA872017, AI694004,

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HFKIT06	296	1078092	1 - 1554	15 - 1568	AA747315, AI392901, AI697980, AW295170, AA148983, AI283647, AA148982, AI393927, AA687243, R70140, H44117, H44044, AI783873, AI918219, R70141, AI741034, D80164, D80227, D51799, C14331, D80022, D59467, D80195, D59275, D59787, D59502, D80269, D59610, D58283, C15076, D59859, D81030, D80166, D51423, D59619, D80210, D80391, D80240, D80253, D80043, D80378, C14429, D80038, D80212, D50979, D80193, D80196, D80188, D80024, D80219, D59927, D80241, D57483, D50995, D80366, D59889, D51060, AA305409, AA305578, C14389, D80045, C14014, T03269, AW178893, C75259, AW177440, D51022, AW378532, D81026, D52291, AW352158, AA514188, D80134, AW179328, AW178775, D51250, D80251, D59695, AA514186, AW369651, C14407, D80522, F13647, D80248, D80133, D58253, D80168, AW178762, AW177501, AW177511, C14227, AW360811, AW378540, D81111, C14298, AI557751, AI910186, D80268, D80064, AW176467, C05695, AI905856, AW352117, AW375405, D80439, AW377671, D80247, D80302, Z21582, AW360834, AW366296, AW360844, AW360817, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, AW178906, D80132, D51103, AW352171, D51097, AW377676, AW352170, AW177731, AW178907, AW179019, AW179024, D59373, AA285331, D80157, AW177505, AW360841, AW179020, AW178909, AW177456, AW352120, AW179329, D51759, AW178980, AW177733, AW378528, AW178908, AW178754, AW179018, T11417, AA809122, C06015, AW177728, AW179004, AW179012, AW367967, AW178914, AW178774, AW378543, AW378525, T48593, AW178983, AW177722, AW352163, AW352174, AW179009, AW178781, AW178911, D59653, AI535686, D45260, D59503, AW177508, D58246, AI525923, AW367950, D59627, H67854, C03092, H67866, D58101, C14344, AW177723, AI557774, T03116, AW177497, D59317, AW178986, D80258, AI525920, D45273, AI525917, AI535850, D80014, C14973, AW378533, D51213, AI525227, D80228, D60214, D51221, D59551, D59474, AW177734, D60010, AA514184, N66429,



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HDTBY88	297	1104159	1 - 523	15 - 537	AA868305, AI700890, AA789239, AI803004, AI694352, AA043382, F08474, R21498, AF112183, AF112184, and AC005354.
HWLHS82	298	1082268	1 - 1335	15 - 1349	AI939391, AW401390, AI202873, AI869600, AW411117, AI142585, Z99396, H50446, AL119457, AL119324, AL036418, AL038837, AL037051, AL036725, AW392670, AA631969, AL119443, AL039074, AW384394, AL036924, AW372827, AW363220, AL036858, AL119497, AL119355, AL037094, AL038509, AL039564, AL119483, AL039085, AL119335, U46351, AL119319, AL036196, AL039156, AL039108, AL039109, AL039128, AL036190, U46349, AL119341, AL119484, AL119363, AL119391, AL042544, AL119399, AL036767, AL039659, U46350, AL119418, AL037082, AL119522, AL037526, U46341, AL134902, AL037639, AL119396, AL038531, AL042984, AL119496, U46347, AL037085, AL119444, AL036268, AL134533, AL039625, AL039648, AL037077, AL045337, AL119401, AL036238, AL037205, AL119439, U46346, AL134536, AL038447, AL042450, AL042909, AL043033, AL039386, AL039678, AL039629, AL119464, AL134538, AL042614, AL036733, AL039423, AL038520,

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HDPNC96	299	1081629	1 - 720	15 - 734	AA256100, and AB023182.
HCE5I78	300	1197899	1 - 3149	15 - 3163	AA988953, N63548, AA663569, H15532, H38453, AA976078, N94873, H41422, H46380, R88023, N51089, H41541, H48172, AI423964, H38492, AI421373, R18083, AI208504, AI003013, R90757, R88479, H11023, R40487, R42977, H85702, AW207073, R87980, AA338374, H84794, H15589, AA325807, H10745, AA319224, AA338373, W28283, R13057, AA325143, N54215, AB023202, D13613, AC004551, D29965, U12571, and AC004465.
HISDS62	301	1159625	1 - 888	15 - 902	AA126105, AA306119, W27339, D80253, D80366, D80043, D58283, D80188, D59502, D80166, D80195, D51423, D59619, D57483, D80210, D51799, D80240, D59859, D80391, D80212, D80219, D80227, D59889, D80196, D51060, D81030, D59927, D59610, D80269, D80038, D80022, D80024, D80193, D59275, C14389, D50979, D59787, D50995, D80241, C14014, C75259, D80045, C14429, D80164, D80378, D59467, T03269, C14331, C15076, AA305409, D80251, AW178893, D80134, AW177440, D51022, D80949, D51079, D58253, AW178775, AW179328, AA305578, AI905856, AW378532, D80248, D51097, D80522, AW352158, D81026, D59695, AA514186, AA514188, AW177501, AW177511, AW178762, D80268, AW360811, D80133, R58551, AW352117, AW375405, AW366296, AW377671, AW360844, AW360817, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, D80302, D80439, D80247, D80132, AW352171, AW377676, AW352172, AW178906, AW352170, AW177731, AW178907, W27700, AW179019, AW179024, AW177505, AW179020, AW178909, AW177456, AW179220, AW179329, AW178980, AW177733, AW378528, AW178908, AW178754, AW179018, AW179004, AW178914,

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HDQDV69	302	1212566	1 - 2558	15 - 2572	N63562, AI905612, N75655, N94726, AA297704, N64807, AI919048, AI567676, AI884404, AI797998, AI570067, AA765899, W27084, AW162314, AA632355, AI174827, AI281622, AW021674, AW085626, H86399, AA196994, AI745666, AI888050, AW029626, AA527633, AI150934, AW303052, AI065031, AI003391, AI049845, AW410844, AL121039, AW192930, AL138262, AI702049, AI307563, AI445699, AW162332, H47461, AI434103, T03928, AA015948, AW265468, AW328185, AA828840, AI538404, AA610644, W02419, AI547110, AI828721, AI370470, AI890857, AI744259, AI302350, AA847341, AI268465, AI003086, AI733523, AI064968, AW020612, AL118628, AW148821, H81270, AA568433, AI889177, AI857834, AI312614, AI280566, AA557945, AW149241, AI624191, AW327673, N49298, M77888, AA846046, AI744963, AW239465, AI311796, AI003068, AL044966, AA748071, AI791659, AI590404, N55076, H53109, AA947352, AA814719, AI801563, AA525953, AA199582, AA598608, AA280886, AI926656, AW439224, AI167715, AI207534, AA152398, AA167656, AW070901, AA133568, AI446574, AI905408, AI815770, AI934664, AA969564, AA846014, AI344906, AI318548, AA601712, AI819419, H48017, AW028376, AW419201, AI683079, AI376687, AA676462, AA313025, AA935827, AI969090, AI342863, AA715848, AA604149, AI754926, AA112864, AA018258, AA315052, AI350189, AI049999, AW152451, AI076729, AA774223, AA487053, AI800706, H62123, AI221027, AA669165, AA668727, AI039257, AI860423, AA601718, AA421536, AA602458, AA084439,

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HEMBT61	303	939957	1 - 449	15 - 463	N86549, AW369713, and AB002301.
HRODZ70	304	1088554	1 - 927	15 - 941	AA167766, AA167655, AA292911, H97685, AA635138, Z41812, AA507096, R40592, T17069, and AB007941.
HHERQ79	305	1184003	1 - 689	15 - 703	AW340333, AW407893, AI806295, AW268810, AA827664, AA829237, AA909185, AA919008, AA604425, AI539428, AA011359, D63485, AB016590, and AB016589.
HCECM90	306	1031741	1 - 1379	15 - 1393	AA463356, AA453500, AA322899, AA340682, H24259, AA603868, AA330182, R19782, and AB023227.
HWHGW7 2	307	1199614	1 - 1625	15 - 1639	AA961509, AF190823, AF109388, AF190822, AF109387, AF190825, AF053328, AF053327, AF190824, U14414, AF053329, Y10473, Y10475, Y10474, AF020759, AF064549, AF190826, AF020756, and Y09910.
HPCRV84	308	1219890	1 - 863	15 - 877	AA307070, D79997, L76158, and X95351.
HNSAA28	309	946988	1 - 1544	15 - 1558	AA713959, AI564093, AA768779, AA825697, AA808021, AA808149, AI401490, AW181992, AW444640, AI018159, AF146277, and AF077003.
HLWAR77	310	947484	1 - 1275	15 - 1289	AA449919, AA449920, and AF119815.
HTTJW49	311	1127477	1 - 1486	15 - 1500	AW268880, AA199865, AW444872, AI769428, AI061340, AA707168, AI970984, AW236544, AI884812, AI479954, AI356088, AI701720, AA722812, AI989992, AA410516, AI765045, AI267987, AI298592, AA005114, AI865503, AW389168, AA360112, AI633370, AI498423, T55265, AA878382, AF118838, Y17571, AF164632, AC002450, AF164529, AF164526, AF164530, AF164528, AF164527, AC004458, AC002540, and

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HWAFS18	312	1155193	1 - 1873	15 - 1887	AW009940, AI394293, AI082857, AW207417, AA227673, N99896, AA227560, AA491391, AA361942, AI000839, W25237, AA491389, and AF156884.
HFCBA44	313	1082762	1 - 769	15 - 783	R85476, AW293022, AA339398, D80166, D80193, D81030, D59502, C14389, D80195, C15076, D80164, D59619, D80210, D80240, D80045, D80022, D59467, D59275, D80219, D80227, D80212, D80269, D58283, D59859, D80391, C14331, D59787, D51423, D51799, D80253, D80038, D80043, D80196, D81026, D50979, D80366, D80188, D59927, AA305409, D57483, D80378, D59889, D50995, D80024, D59610, D80133, D51060, C14014, AA305578, C14429, AW178893, D80248, D80522, D80241, AA514188, D51022, T03269, AW360811, AW177440, D80302, D80251, C75259, AA514186, D80439, AW377671, AW375405, AW179328, D80268, D80247, AW378532, AW352158, AW366296, AW360844, AW360817, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, AW178775, AW178762, D59373, D80134, AW369651, AW377676, D80157, AW177501, AW177511, C05695, D51250, D51103, AW352171, AW352170, D59695, AW178906, AW177731, AW178907, AW378528, AW179019, AW179024, D80132, D51759, D52291, AW176467, D80949, AW360841, AW177505, D80168, AW179020, C06015, D80064, AW178909, AW177456, AW179329, AW178980, AW177733, AW178908, AW178754, AW179018, C14298, AW352117, AW378540, D59653, D58253, C14227, D59503, AW179004, AI905856, AW179012, AI910186, AW178914, AW378525, AW352163, C14407, T48593, AI525923, D80258, AW360834, AW178983, C03092, AW179009, D45260, AW178774, AW178911, AW378543, AW177722, AW177728, AW352120, D58246, D59627, AA809122, H67854, H67866, AW178781, AI525917, D59317, T03116, D58101, C14077, T11417, AW367950, D51097, F13647, AW178986, AI525925, AW177723, AI535686, D81111, AI525920, D80014, D59551, C14973, AI525227, C14344, AW378533, AI557774, D51221, AA514184, D59474, D60010, D51213, D60214, AI525242, AI525235, AW177734, C14957, C14046, T03048, AI525912, AI525215, AI525222, D45273,

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HVADT77	314	1180374	1 - 236	15 - 250	AI217375, AI554767, AI948424, AI693185, AL134259, and AC006356.
HUFCN91	315	1189013	1 - 2534	15 - 2548	AW401749, AW451778, AW450685, AW268855, AW152133, AI983406, AI656119, AI961994, AW448985, AI831678, AW403024, AW296492, AA195250, H09181, AI433189, AA258743, AA258380, AA866028, AI982819, AI919443, H09127, C01544, AA262275, and Z85996.
HAGBX32	316	951351	1 - 624	15 - 638	W29095, H04905, H11833, AF100346, and AC004125.
HWMIB81	317	1092933	1 - 1604	15 - 1618	AW380440, AW299858, AW391525, H78769, H78659, H53674, AA628987, AA447173, AW204470, AA343468, AA480342, AA114131, and AF155118.
HCEMU86	318	1156430	1 - 2145	15 - 2159	W28902, AI694781, AA780441, W26632, AA861408, AI598157, R87939, AI360413, AA206559, H06785, AA496386, H14668, AA443069, AA437394, AW007070, AA351204, AI499867, AI982847, H14395, AW007079, T08889, AI933154, AA082863, AA085216, F07213, T33930, AA324000, AI366734, AI683546, R35601, T08328, R85233, AA325921, H09089, F07449, AA931914, T09198, AA297096, T07392, H14346, R40510, F02224, R13080, AA975823, R24819, H09438, H06678, F05981, F09630, F11982, AA551277, T83837, T30652, H21015, T65199, F08411, F08469, T33716, F13035, T08309, D54295, R58912, T05132, R51804, AI567931, F10628, T33189, T03545, H06677, R41862, Z19847, F04626,

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HRDAF83	319	1153911	1 - 1211	15 - 1225	AI825217, AA316377, AW302711, AI144081, AA488067, AI587537, AI253519, AI953573, AW339743, AW302753, AA828046, AA292719, F35011, R70326, AA601230, T96582, AI053560, AW301906, AI133727, AI973207, AA205743, AW292981, H80463, AW085744, AA297496, AA502223, AA730601, H73438, AW438539, AA262086, AW301854, AA654849, AA491864, AA640495, AA363225, AI435248, AL041325, R21949, AA904231, AI696343, AA159046, AI745457, AI754567, AI754105, AI755214, AA669132, AA652267, AA984920, N25819, AA479930, AI734052, AI625693, AF109681, AF137378, AL135747, AL035251, AL049553, Z99128, AC002431, AC003046, AP000704, AC005993, AL020993, AC005844, Z95113, L44140, AC004068, AF002223, AP000500, AC004910, AL133163, Z84489, AC003012, Y10196, AC003664, L40817, X92763, Z73359, AC004757, AL035458, AF051976, AC003044, AF196971, AL109758, AC007298, AC006559, AC000026, AL031985, AC004150, AC005668, AL022326, AC007707, AL049653, AC002059, AP000212, AP000134, Z83855, AL023285, AC005193, AP000030, AL035106, Z49250, AP000251, AC003007, AC004675, AC003084, AC007934, AC005083, Z83845, AP000402, L42103, AL049778, AL117592, AC005189, AC002457, AP000013, L48038, AL121577, AL049709, AC005608, AC005304, AL109865, Z23091, AF190465, AC005212, Z97053, AL023653, AL049538, Z93244, AL133245, AC006312, AC002470, AC010205, AC005632, AC005773, AC005409, AL109627, AF054589, AL034548, AL121655, AC002430, AC006145, AL139054, AL109977, AC007878, AC005871, AP000459, AL031602, AL078477, AL080243, AC007384, Z68756, AC006965, AC004966, AL031657, AL035089, AL035249, AF020503, AC009294, AL034429, AC001231, AC018633, AC005696, AL022721, AL031289, AC005730, AC005011, AP000155, AC004094, AC005949, AC005969, AC004673, AP000565, U95739,



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HUVGZ88	320	1204719	1 - 2072	15 - 2086	AI302185, AI652375, AI418298, AI936871, AI394630, AW206793, AI025217, AI983297, AI025310, AW002416, AI559159, AA593826, AW140018, AW401787, AI017077, AW239548, D54154, T03397, H42947, D57560, AW192088, R23870, AA026054, AA503315, Z40806, AW375742, F07734, AI807678, C14980, AA297059, AW338394, AI073417, AW138409, AA088799, AI356604, C15480, AI825970, AI537006, AI168175, R46685, AW078709, AA364780, AI343378, R46686, AW137324, AI015047, AA974700, H42881, AA325059, AI831833, H22172, T30407, AA897415, Z44281, F03562, R45025, F03423, F07299, R25015, AA382960, T32685, AW163027, AI815476, AA471062, T82311, AI911100, AW157059, R08769, AA047793, AA382959, and AW373232.
HSCKS55	321	1197921	1 - 2278	15 - 2292	AW183030, AA535809, AI885834, AI831611, AA534906, T15603, AI364740, H29399, N27334, AI689402, H17545, AA353936, AA903747, R81708, D31451, R33400, AI707698, N75704, AI735097, R31870, AI608711, AI357830, R87560, AA954380, AI904965, AI289077, Z78378, AL046356, AL045891, AL041862, AI432666, AI434223, AL047675, AW172723, AL119748, AW151138, AL042787, AI366900, AI815232, AI805769, AI433157, AW151136, AI539771, AL042551, AI537677, AI494201, AI866786, AI500659, AI801325, AI500523, AI436429, AI582932, AI284517, AI923989, AI500706, AI445237, AI491776, AI521560, AI889189, AI500662, AI284509, AI860003, AI889168, AI866573, AI633493, AI434256, AI888661, AI284513, AI888118, AI889147, AI371228, AI440252,

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HOET48	322	963290	1 - 1466	15 - 1480	AI797684, AW239200, AA456267, AI478733, AI751749, AI990902, AA427646, AI379565, AI970534, W95460, AA788855, AA405402, AW068453, AW294114, AI751750, AA594137, AA947297, AW177719, AI057073, AA427487, AI341112, AA232452, AA041304, AW068711, H73236, AA041328, W95567, AW167569, AA853047, AI652166, W02069, H74164, R34003, AI341381, AW176526, AA580289, D30965, D31176, AA367502, and AR035969.
HBODE51	323	1193149	1 - 2774	15 - 2788	AW411466, AW137475, AA922772, AA974304, AW204679, H05447, AI357778, AL044000, AL138265, AI038990, AW131249, D63198, AL120269, AI951863, AI732911, AI471543, AA601355, AL048969, AW102811, AA722372, AW248523, N66012, AW055226, F28204, AI457389, AA837677, AI952885, N49425, AW188427, AI863046, AW080062, AW070703, AA618412, AL079869, AL137984, AW167374, AL046746, AI791227, AL135698, AA610271, AA631507, AA604395, AA593752, AA706495, AL119123, N80210, AW204532, AW085751, AL046457, AA603421, AL042539, AA130901, AI313166, AA223932, AW008089, AA515250, AI859742, AL038705, AA634991, AI821044, AA577719, AI028148, AI569982, AI583978, AA744826, AA121815, AA679794, Y16610, AC004491, AF134726, AC005529, AC005015, AL022316, AC005081, AC009247, AC004383, AC002310, AC004967, AC005694, AC006312, AC007225, AF111169, U47924, AP000553, AC005484, AC004821, AC005531, AC005011, AL109984, AC004638, AL009181, AC006211, AC004851, AL096791, AP000688, AC004678, AC006285, AL031311, AC004263, AC007216, AC002316, AC006120, AC005837, AC005037, AC004019, AB023049, AC000025, AC007055, AL031681,

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HHFCK09	324	965304	1 - 2789	15 - 2803	AI218626, AI076006, AW162820, AI797880, AI922744, AI872391, AI559566, AL045117, AW161046, AW162613, AI565503, AW183962, AI857802, AA460810, AI884907, AI371131, AW248493, AI081779, AA460372, AA679085, N27884, AA581796, AA074070, AA971563, AI292006, AI922373, W76538, N93245, AI609183, AW172513, AI904299, AI682939, AA075764, AI885613, AA747871, AA449042, AA928020, AW401847, AA449757, AW268637, AW073851, AW304978, AI683858, AA568598, W74167, AI367698, AW191998, N62781, AW016535, AI902503, AA347639, AA297591, AA379280, AA568887, AA649970, AW264577, AI221886, H20460, AW387087, AW000860, AI275195, AA341002, T32918, AW162711, W25103, AI699657, R42681, AW243790, AA768740, T78554, AI279653, AI560482, AI696251, AI951374, Z45830, AA147203, AI499410, R43259, AI350354, AA732831, AW079129, AA375228, F08622, AI475009, R56337, AA379846, R17163, AW380349, AA783050, AW247402, N47545, R35508, R51077, AI474934, N79729, D61534, Z41466, AI678630, AA339343, AW367003, AA160401, Z41592, AW079321, N47546, AI252528, R58857, T16943, H55297, AL022238, AL137499, and AJ236700.
HCOOZ11	325	1110364	1 - 1321	15 - 1335	AI218626, AI076006, AI797880, AI872391, AI922744, AA449042, AI559566, AW162613, AI565503, AI857802, AW248493, AI922373, AI292006, AA679085, AI904299, AA074070, W76538, AI682939, AA928020, AI609183, AW172513, N79729, AA747871, AI885613, AA449757, AW268637, AW183962, AW304978, AA568598, AI683858, AA379280, AI371131, AI884907, N62781, H20460, AI367698, N93245, AW073851, AW191998, AA581796, AA568887, AW016535, T78554, AI081779, AI221886,

					AW264577, AA649970, AI350354, AI275195, AI902503, AW000860, AW162711, AI699657, AA460372, AA379846, AA147203, AI951374, AI560482, AW243790, R42681, AA375228, AI499410, AI279653, AA732831, AI475009, N47545, AI696251, R43259, D61534, AA783050, AW079129, AI474934, R51077, AA160401, Z41466, W74167, AI678630, Z41592, AW079321, N47546, AL022238, and AL137499.
HDPP035	326	1119032	1 - 1889	15 - 1903	AI640500, AW439548, AI823872, AW297416, AA831672, AI815031, AA994323, AA741162, AA471280, AW339548, AI223999, AW235171, AI635436, AA035703, AA747998, AI371399, N67227, AA361754, AI536057, AA063573, AI357169, R33401, C01451, R33402, AA825399, AF165138, and AF130247.
HLWDZ53	327	1157542	1 - 2001	15 - 2015	AA772242, AI309977, AI268079, AW152237, AI923556, AI968056, AA394106, AI985775, AI124863, T66217, AA700659, AA398135, AA927679, W68401, AW105606, AA989587, Y08708, AA559050, W68288, H11047, R23506, AI277174, F09831, H08254, R37378, AA339671, H11135, Y08709, H08154, H46511, R50952, H47050, F12201, R13468, AA320227, W31952, Y08714, R44639, R35282, H58759, H11255, T66150, W31329, AI910241, AA772192, AA662681, N84315, Y08707, T08656, AP000546, and AC002038.
HEOPL36	328	1197910	1 - 2122	15 - 2136	AI061632, AW316850, AW367730, AA814516, AW367737, AI754746, AA777525, AW367804, AI097103, AW367782, AW367735, AW367773, N30303, AA847688, AW404639, N31888, AA779663, AW367809, AW367777, AW367785, AI923024, AA953814, AW367237, AI305265, AI624406, AA582843, N20267, AI827125, AI093328, AA911743, AI292227, AI684334, AI554543, AA290888, AW367806, AA503789, AW367741, H29119, AW338358, AW342022, R55898, AI401634, W79584, N45284, H25738, AA626619, AI024861, N31823, N42550, N33984, H17043, H41983, H99343, AI002168, AI979180, AI311586, N78814, AA564287, AA351508, AA968656, W20290, N31566, R75948, AI372938, AI277345, Z44878, AW367805, H29018, H60714, H17044, H71114, AI567783, H53271, AA599764, R60811, AI673673, T35639, AA158814, AI129803, H60713, H25974, AI423976, R61308, T30051,

				AA582155, AI174537, AI186537, AA705042, M85360, W79783, N29173, AA161097, R00089, N26452, Z17839, F01057, T34112, N54731, AI471185, AI023664, AW130265, W31954, H41935, T33806, R59766, AA826327, AI244584, AI202016, AI077600, N90670, AW009848, AA987544, N24540, AI432312, R09698, AA777544, R76786, AW081089, T31022, AW089365, AI468541, Z40650, AI217229, AI371184, T77157, Z28806, AA069041, AA505841, N42027, N42580, AI220752, AA346958, AI497869, AA160430, T32679, R09699, R55813, AI400851, AA298583, AI919072, T33966, AA159592, AW196132, AA743892, AI689177, W31331, T34006, AA911196, AW371882, AA301187, AW367265, AI217099, AA856916, AA879055, N29277, AI285514, H89138, AI819663, AA830044, AI687568, AW411043, AI583578, N49165, AW020381, AW151132, AW080076, AI954721, AI610426, AW198112, AI306705, AI306613, AI656270, AI628875, AI811373, AA737649, AI612885, AW189196, AA838230, AI274527, T66952, AI421662, AI249946, AL039011, AI470717, AI624529, AI318603, AW059828, AW303152, AI380329, AI225000, AI345778, AL037626, AI702527, AI627714, AI796743, AI056328, AI473652, AI280561, AW090550, AL045983, AI491904, AI799273, AI886355, AI933992, AI114703, AI678446, AW409775, AI479292, AI648699, AI250282, AI868204, AW022907, F37409, AI590043, AI500061, AW188388, AI553926, AI524654, AA579232, AI401697, AW080157, AW083484, AI815232, F26535, AA420722, AI471909, AA514684, AI370623, AI538885, AA761557, AW150762, AI540382, AW021189, AI682968, U69181, AL036980, AI860027, AW166870, AI452857, AW149849, AI628325, AI537187, AA746607, AI349957, AI804505, AF128536, AL049758, AF128535, AF139495, AF139493, AF139494, AF139492, AR030257, AL133624, AL133047, AF185614, U70981, AL137271, AL137555, U72621, AL049276, AR060156, AL133014, AJ010277, U57352, Y14634, I48978, AL080234, A07647, AF036941, AF115392, AR029580, L13297, AL122050, AL110222, AF102578, AF124728, AL137298, A58524, A58523, AF090943, AF038847, AF210052,
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HMCFS02	329	1152252	1 - 1432	15 - 1446	<p>AL119990, AI459232, AI990971, AW274849, AA524531, AI703399, AW295852, AI086621, AI582316, AI887899, AI198620, AW444954, AI201159, AI761662, AA769116, AI678189, AI769819, AA908833, AW001104, AI797112, AW339272, AW151222, AI025272, AI638810,</p>

					AA291544, AW083242, AA781447, AW003604, AW015232, N30310, AA831760, AI624665, AI027612, AW276610, AW168171, AA442455, AW170708, AI807572, AW080508, T62956, AI052790, AA827853, AA737447, AI969056, AA465529, H03505, R78862, AW378235, AA465115, AW205495, AA515398, AI972735, AA805386, AA436647, H03615, N56642, AI825714, AA293351, AI473377, AA404571, AI349471, AW292091, T63206, AA252574, R79349, Z38283, AA399447, AI582475, AI870404, AA252529, AA708728, AI670981, AA429843, C06324, C06235, T88738, AA429867, AA748807, T10782, AW392315, AI650622, and D20600.
HDPSR15	330	1194752	1 - 1682	15 - 1696	AW195239, AW149418, AA461376, AW005579, AI392913, AI378013, AA461199, AI860240, AA779830, AI436586, AA147800, AA576717, AI276889, AW337924, AI264931, AI203549, AA459985, AW104319, AA460078, AI377235, AI925811, AI094031, AI291778, AI612894, AA147758, AA639492, AA767986, AA037273, R61563, AA463275, H59980, AA832298, AA417605, AA628790, AW166255, AA768536, R35919, AI289261, AA157070, AA731955, AI273576, AA508841, AI360737, N47107, AI301339, AI682196, AA463188, H59937, AI208175, D20738, AI391726, W42645, R14353, AI271983, AI073411, N30324, N56657, T53535, H57854, AW001677, R35723, AI242094, AA969269, N50317, AI808646, AA514325, AI280324, AA360254, AI699261, AA551384, T77863, AA263061, AA906804, AA741518, T11446, AI091790, AA505982, AI208678, AA031793, AA214523, AA428834, T12550, T11445, AB026289, and AR044150.
HNTAV78	331	1217231	1 - 3733	15 - 3747	AI417713, AW235714, AI537274, AL042544, AL119457, AL119511, AL119399, AL043152, AL042382, AL119324, AL134524, AL079794, AI431323, AL043168, AI889189, AI521560, AI433157, AI539771, AI537677, AI500659, AI801325, AI500523, AI284517, AI500706, AI445237, AI491776, AW151138, AI500662, AI284509, AI633493, AI538885, AI866573, AI434256, AI888661, AI284513, AI888118, AI582932, AL045500, AI537273, AI815232, AI433976, AI567935,

					AI554821, AI889376, AI371251, AI889168, AI620284, AI275175, AW151136, AL042551, AI866510, AL042365, AI923989, AI440252, AL110306, AI499463, AI929108, AI610362, AI440239, AI927233, AI436456, AI432656, AI567940, AI817244, AL042787, AL119863, AI612913, AL041862, AI285826, AI863014, AI499512, AI889133, AI610402, AI434223, AI610429, AI963846, AL042538, AI432666, AI805769, AI889148, AI628850, AI633125, AW161579, AI866608, AI859991, AI567993, AI860003, AI364788, AL036980, AI922901, AI491710, AL042866, AL134259, AW022682, AI889147, AL047422, AW083804, AL045163, AI866457, AA572758, AI446373, AI654276, AI866786, AI612885, AA420758, AI874166, AI494201, AW089272, AW021717, AI805762, AL048496, AI866469, AL037454, AI872423, AW301300, AI349598, AW172723, AI702073, AI440263, AW269097, AI434242, AW051258, AW191003, AI436429, AI371228, AI872300, AI610557, AI242736, AI887499, AI539632, AI539847, AL045620, AL042627, AL042557, AI433037, AI500714, AI567961, AW081255, AL079741, AI538850, AI955441, AI345010, AW129106, AL042745, AI312428, AL036705, AL039086, AW020693, AI289791, AI890907, AI521594, AW087445, AA613907, AI348897, AI635492, AI670009, AI673278, AW023072, AL119836, AI269862, AI637584, AL119828, AI432644, AI340603, AL036631, AI582926, AA635382, AA259207, AI567953, AI537515, AI318280, AI537191, AA420722, AW082113, AI499131, AL119791, AL040241, AI866465, AL119748, AI274759, AI916419, AL047387, AI811344, AL046926, AW268220, AL041573, AI431307, AW073865, AI049851, AI648567, AI690946, AL022726, AC006296, AL031295, AL030998, AC007392, AC005224, AL096709, AC005723, AC008394, AC010175, AC006115, AC004062, AL009029, AL031123, AC004808, and Z83840.
HFKDR14	332	1145842	1 - 1308	15 - 1322	AI761729, AW104395, AW298361, AI073443, N40162, AW162515, AI827518, AW297353, R52045, AI342317, R71958,

					AF128625, AF021936, and AW517595.
HDPBI30	333	974711	1 - 2911	15 - 2925	AA714520, N78665, W15172, AL134531, AA074818, AI251157, AI311635, AA079403, AW130754, AI935943, AF083955, AC005015, AL034423, AP000030, AC002992, AC004216, AC003013, U91321, AC003684, AC002528, AL117258, AL021155, AP000045, AF053356, AL033521, AC004598, U91326, AL035072, AD000091, U82668, AC012384, L44140, AF006752, AL034350, AC006039, AC005756, AC005072, AL034429, AC002352, AC005682, AC003663, AC005049, AC007298, AC005620, AC004887, AL117694, AC005911, AC007688, AC006014, AC004797, AL031186, AL031283, AC004963, L47234, Z84466, AC004125, AC005529, AL031293, AC006276, AL034400, AC004099, AC005089, AL049871, AC004893, AL080243, AC007021, AL049712, AC007993, AC006581, AC005837, AF139813, M13792, AC005086, AL096791, AJ251973, AC002301, AC006139, AC005488, L78810, AC006115, AC004966, AC006538, Z93244, AC004834, AL049570, AC004084, AP000113, AP000251, and AC005696.
HODFF88	334	1094875	1 - 1843	15 - 1857	D80164, D59502, D80193, D80195, D59275, C15076, D80227, D58283, D80022, D80166, D81030, D59859, D51799, D59619, D80210, D80391, D80240, D59787, D51423, D80253, D80043, D80269, D50979, D80212, D80038, D80196, D80024, D80219, D80188, C14331, D59467, D57483, D59927, D80378, D80366, C14389, D59889, D50995, D80045, D59610, AA305409, C14429, D80241, D51060, T03269, C14014, AW178893, C75259, AA305578, D81026, D59695, D51022, AW179328, D81111, AW178775, D80134, AW378532, AW177440, D51250, AW352158, D80268, F13647, AA514188, AW369651, D80251, D80522, D51079, D80248, D80949, D58253, AW178762, D80168, D52291, C14227, AA514186, AI905856, AW177501, AW177511, D80133, Z21582, AW360811, C05695, C14298, AW352117, D80064, AW176467, AW375405, AW378540, C14407, AW377671, D51097, AW366296, D80302, AW360844, AW360817, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, D80132, AW360834, AA285331, D80439,

				<p>AW352171, AW377676, AW178906, AW352170, AW177731, D80247, AW178907, AW179019, AW179024, D51103, AW177505, AW360841, AW179020, AW178909, AW177456, AW179329, AW178980, AW177733, AW378528, AW178908, AW178754, AW179018, AW179220, AI557751, AW179004, AW178914, AW378525, AW352174, T11417, D80157, AW177728, D59627, D51759, AW367967, AW178774, AW178911, AW378543, AW352163, D59503, D80258, D80014, C06015, AI557774, AW178983, AW352120, T03116, AW178781, T48593, D58246, C14077, D59653, AW177723, D58101, D45260, AI525923, AW178986, AW367950, C03092, AA809122, H67854, D59551, H67866, C14975, T02974, AW378533, AW378539, D51213, AW177734, AI535686, D59317, D51221, AI525917, C14973, AA514184, C14344, D45273, AI525925, AI525920, D59474, AI525227, D31458, C14046, AI525242, AI525235, T03048, AI525912, AW378542, AI525215, AI525237, C16955, C05763, Z33452, AI535850, AI535961, A84916, AJ132110, A62300, A62298, AR018138, X67155, Y17188, D26022, A25909, A67220, D89785, A78862, D34614, D88547, AF058696, X82626, AR008278, AB028859, AR025207, I82448, Y12724, A82595, AB012117, AR060385, AB002449, A85396, AR066482, A44171, A85477, A94995, X68127, I19525, A86792, X93549, AR008443, AR016808, U87250, I50133, I50126, I50132, I50128, AR066488, AR016514, AR060138, A45456, A26615, AR052274, I14842, Y09669, A43192, A43190, AR038669, AR066487, A30438, AF135125, D88507, AR066490, D50010, AR054175, I18367, Y17187, A63261, AR008277, AR008281, AR008408, AR062872, A70867, AB033111, AR016691, AR016690, U46128, D13509, AR060133, I79511, AR064240, A64136, A68321, U87247, AB023656, U79457, AF123263, X93535, and AR008382.</p>
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**TABLE 4**

Code	Description	Tissue	Organ	Cell Line	Disease	Vector
AR022	a Heart	a Heart				
AR023	a Liver	a Liver				
AR024	a mammary gland	a mammary gland				
AR025	a Prostate	a Prostate				
AR026	a small intestine	a small intestine				
AR027	a Stomach	a Stomach				
AR028	Blood B cells	Blood B cells				
AR029	Blood B cells activated	Blood B cells activated				
AR030	Blood B cells resting	Blood B cells resting				
AR031	Blood T cells activated	Blood T cells activated				
AR032	Blood T cells resting	Blood T cells resting				
AR033	brain	brain				
AR034	breast	breast				
AR035	breast cancer	breast cancer				
AR036	Cell Line CAOV3	Cell Line CAOV3				
AR037	cell line PA-1	cell line PA-1				
AR038	cell line transformed	cell line transformed				
AR039	colon	colon				
AR040	colon (9808co65R)	colon (9808co65R)				
AR041	colon (9809co15)	colon (9809co15)				
AR042	colon cancer	colon cancer				
AR043	colon cancer (9808co64R)	colon cancer (9808co64R)				
AR044	colon cancer 9809co14	colon cancer 9809co14				
AR045	corn clone 5	corn clone 5				
AR046	corn clone 6	corn clone 6				
AR047	corn clone2	corn clone2				
AR048	corn clone3	corn clone3				
AR049	Corn Clone4	Corn Clone4				
AR050	Donor II B Cells 24hrs	Donor II B Cells 24hrs				
AR051	Donor II B Cells 72hrs	Donor II B Cells 72hrs				
AR052	Donor II B-Cells 24 hrs.	Donor II B-Cells 24 hrs.				
AR053	Donor II B-Cells 72hrs	Donor II B-Cells 72hrs				
AR054	Donor II Resting B Cells	Donor II Resting B Cells				
AR055	Heart	Heart				
AR056	Human Lung (clonotech)	Human Lung (clonotech)				
AR057	Human Mammary (clonotech)	Human Mammary (clonotech)				
AR058	Human Thymus (clonotech)	Human Thymus (clonotech)				
AR059	Jurkat (unstimulated)	Jurkat (unstimulated)				
AR060	Kidney	Kidney				
AR061	Liver	Liver				
AR062	Liver (Clontech)	Liver (Clontech)				
AR063	Lymphocytes chronic	Lymphocytes				

	lymphocytic leukaemia	chronic lymphocytic leukaemia				
AR064	Lymphocytes diffuse large B cell lymphoma	Lymphocytes diffuse large B cell lymphoma				
AR065	Lymphocytes follicular lymphoma	Lymphocytes follicular lymphoma				
AR066	normal breast	normal breast				
AR067	Normal Ovarian (4004901)	Normal Ovarian (4004901)				
AR068	Normal Ovary 9508G045	Normal Ovary 9508G045				
AR069	Normal Ovary 9701G208	Normal Ovary 9701G208				
AR070	Normal Ovary 9806G005	Normal Ovary 9806G005				
AR071	Ovarian Cancer	Ovarian Cancer				
AR072	Ovarian Cancer (9702G001)	Ovarian Cancer (9702G001)				
AR073	Ovarian Cancer (9707G029)	Ovarian Cancer (9707G029)				
AR074	Ovarian Cancer (9804G011)	Ovarian Cancer (9804G011)				
AR075	Ovarian Cancer (9806G019)	Ovarian Cancer (9806G019)				
AR076	Ovarian Cancer (9807G017)	Ovarian Cancer (9807G017)				
AR077	Ovarian Cancer (9809G001)	Ovarian Cancer (9809G001)				
AR078	ovarian cancer 15799	ovarian cancer 15799				
AR079	Ovarian Cancer 17717AID	Ovarian Cancer 17717AID				
AR080	Ovarian Cancer 4004664B1	Ovarian Cancer 4004664B1				
AR081	Ovarian Cancer 4005315A1	Ovarian Cancer 4005315A1				
AR082	ovarian cancer 94127303	ovarian cancer 94127303				
AR083	Ovarian Cancer 96069304	Ovarian Cancer 96069304				
AR084	Ovarian Cancer 9707G029	Ovarian Cancer 9707G029				
AR085	Ovarian Cancer 9807G045	Ovarian Cancer 9807G045				
AR086	ovarian cancer 9809G001	ovarian cancer 9809G001				
AR087	Ovarian Cancer 9905C032RC	Ovarian Cancer 9905C032RC				
AR088	Ovarian cancer 9907 C00 3rd	Ovarian cancer 9907 C00 3rd				
AR089	Prostate	Prostate				
AR090	Prostate (clonotech)	Prostate (clonotech)				
AR091	prostate cancer	prostate cancer				
AR092	prostate cancer #15176	prostate cancer #15176				
AR093	prostate cancer #15509	prostate cancer #15509				
AR094	prostate cancer #15673	prostate cancer #15673				
AR095	Small Intestine (Clontech)	Small Intestine (Clontech)				

AR096	Spleen	Spleen				
AR097	Thymus T cells activated	Thymus T cells activated				
AR098	Thymus T cells resting	Thymus T cells resting				
AR099	Tonsil	Tonsil				
AR100	Tonsil germinal center centroblast	Tonsil germinal center centroblast				
AR101	Tonsil germinal center B cell	Tonsil germinal center B cell				
AR102	Tonsil lymph node	Tonsil lymph node				
AR103	Tonsil memory B cell	Tonsil memory B cell				
AR104	Whole Brain	Whole Brain				
AR105	Xenograft ES-2	Xenograft ES-2				
AR106	Xenograft SW626	Xenograft SW626				
H0004	Human Adult Spleen	Human Adult Spleen	Spleen			Uni-ZAP XR
H0008	Whole 6 Week Old Embryo					Uni-ZAP XR
H0009	Human Fetal Brain					Uni-ZAP XR
H0011	Human Fetal Kidney	Human Fetal Kidney	Kidney			Uni-ZAP XR
H0012	Human Fetal Kidney	Human Fetal Kidney	Kidney			Uni-ZAP XR
H0013	Human 8 Week Whole Embryo	Human 8 Week Old Embryo	Embryo			Uni-ZAP XR
H0014	Human Gall Bladder	Human Gall Bladder	Gall Bladder			Uni-ZAP XR
H0015	Human Gall Bladder, fraction II	Human Gall Bladder	Gall Bladder			Uni-ZAP XR
H0022	Jurkat Cells	Jurkat T-Cell Line				Lambda ZAP II
H0023	Human Fetal Lung					Uni-ZAP XR
H0024	Human Fetal Lung III	Human Fetal Lung	Lung			Uni-ZAP XR
H0025	Human Adult Lymph Node	Human Adult Lymph Node	Lymph Node			Lambda ZAP II
H0027	Human Ovarian Cancer				disease	Uni-ZAP XR
H0028	Human Old Ovary	Human Old Ovary	Ovary			pBluescript
H0029	Human Pancreas	Human Pancreas	Pancreas			Uni-ZAP XR
H0030	Human Placenta					Uni-ZAP XR
H0031	Human Placenta	Human Placenta	Placenta			Uni-ZAP XR
H0032	Human Prostate	Human Prostate	Prostate			Uni-ZAP XR
H0036	Human Adult Small Intestine	Human Adult Small Intestine	Small Int.			Uni-ZAP XR
H0037	Human Adult Small Intestine	Human Adult Small Intestine	Small Int.			pBluescript
H0038	Human Testes	Human Testes	Testis			Uni-ZAP XR
H0039	Human Pancreas Tumor	Human Pancreas Tumor	Pancreas		disease	Uni-ZAP XR
H0040	Human Testes Tumor	Human Testes Tumor	Testis		disease	Uni-ZAP XR
H0041	Human Fetal Bone	Human Fetal Bone	Bone			Uni-ZAP XR
H0042	Human Adult Pulmonary	Human Adult Pulmonary	Lung			Uni-ZAP XR
H0046	Human Endometrial Tumor	Human Endometrial Tumor	Uterus		disease	Uni-ZAP XR
H0048	Human Pineal Gland	Human Pineal Gland				Uni-ZAP XR
H0050	Human Fetal Heart	Human Fetal Heart	Heart			Uni-ZAP XR
H0051	Human Hippocampus	Human Hippocampus	Brain			Uni-ZAP XR
H0052	Human Cerebellum	Human Cerebellum	Brain			Uni-ZAP XR
H0056	Human Umbilical Vein, Endo. remake	Human Umbilical Vein Endothelial Cells	Umbilical vein			Uni-ZAP XR



H0057	Human Fetal Spleen					Uni-ZAP XR
H0059	Human Uterine Cancer	Human Uterine Cancer	Uterus		disease	Lambda ZAP II
H0063	Human Thymus	Human Thymus	Thymus			Uni-ZAP XR
H0068	Human Skin Tumor	Human Skin Tumor	Skin		disease	Uni-ZAP XR
H0069	Human Activated T-Cells	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0071	Human Infant Adrenal Gland	Human Infant Adrenal Gland	Adrenal gland			Uni-ZAP XR
H0075	Human Activated T-Cells (II)	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0081	Human Fetal Epithelium (Skin)	Human Fetal Skin	Skin			Uni-ZAP XR
H0083	HUMAN JURKAT MEMBRANE BOUND POLYSOMES	Jurkat Cells				Uni-ZAP XR
H0085	Human Colon	Human Colon				Lambda ZAP II
H0086	Human epithelioid sarcoma	Epithelioid Sarcoma, muscle	Sk Muscle		disease	Uni-ZAP XR
H0087	Human Thymus	Human Thymus				pBluescript
H0090	Human T-Cell Lymphoma	T-Cell Lymphoma	T-Cell		disease	Uni-ZAP XR
H0098	Human Adult Liver, subtracted	Human Adult Liver	Liver			Uni-ZAP XR
H0100	Human Whole Six Week Old Embryo	Human Whole Six Week Old Embryo	Embryo			Uni-ZAP XR
H0101	Human 7 Weeks Old Embryo, subtracted	Human Whole 7 Week Old Embryo	Embryo			Lambda ZAP II
H0102	Human Whole 6 Week Old Embryo (II), subt	Human Whole Six Week Old Embryo	Embryo			pBluescript
H0105	Human Fetal Heart, subtracted	Human Fetal Heart	Heart			pBluescript
H0108	Human Adult Lymph Node, subtracted	Human Adult Lymph Node	Lymph Node			Uni-ZAP XR
H0116	Human Thymus Tumor, subtracted	Human Thymus Tumor	Thymus			pBluescript
H0118	Human Adult Kidney	Human Adult Kidney	Kidney			Uni-ZAP XR
H0122	Human Adult Skeletal Muscle	Human Skeletal Muscle	Sk Muscle			Uni-ZAP XR
H0123	Human Fetal Dura Mater	Human Fetal Dura Mater	Brain			Uni-ZAP XR
H0124	Human Rhabdomyosarcoma	Human Rhabdomyosarcoma	Sk Muscle		disease	Uni-ZAP XR
H0125	Cem cells cyclohexamide treated	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		Uni-ZAP XR
H0130	LNCAP untreated	LNCAP Cell Line	Prostate	Cell Line		Uni-ZAP XR
H0131	LNCAP + 0.3nM R1881	LNCAP Cell Line	Prostate	Cell Line		Uni-ZAP XR
H0132	LNCAP + 30nM R1881	LNCAP Cell Line	Prostate	Cell Line		Uni-ZAP XR
H0134	Raji Cells, cyclohexamide treated	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		Uni-ZAP XR
H0135	Human Synovial Sarcoma	Human Synovial Sarcoma	Synovium			Uni-ZAP XR
H0136	Supt Cells, cyclohexamide treated	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		Uni-ZAP XR
H0141	Activated T-Cells, 12 hrs.	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0144	Nine Week Old Early Stage Human	9 Wk Old Early Stage Human	Embryo			Uni-ZAP XR
H0149	7 Week Old Early Stage Human, subtracted	Human Whole 7 Week Old Embryo	Embryo			Uni-ZAP XR

H0150	Human Epididymus	Epididymis	Testis			Uni-ZAP XR
H0154	Human Fibrosarcoma	Human Skin Fibrosarcoma	Skin		disease	Uni-ZAP XR
H0156	Human Adrenal Gland Tumor	Human Adrenal Gland Tumor	Adrenal Gland		disease	Uni-ZAP XR
H0159	Activated T-Cells, 8 hrs., ligation 2	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0163	Human Synovium	Human Synovium	Synovium			Uni-ZAP XR
H0165	Human Prostate Cancer, Stage B2	Human Prostate Cancer, stage B2	Prostate		disease	Uni-ZAP XR
H0166	Human Prostate Cancer, Stage B2 fraction	Human Prostate Cancer, stage B2	Prostate		disease	Uni-ZAP XR
H0169	Human Prostate Cancer, Stage C fraction	Human Prostate Cancer, stage C	Prostate		disease	Uni-ZAP XR
H0170	12 Week Old Early Stage Human	Twelve Week Old Early Stage Human	Embryo			Uni-ZAP XR
H0171	12 Week Old Early Stage Human, II	Twelve Week Old Early Stage Human	Embryo			Uni-ZAP XR
H0172	Human Fetal Brain, random primed	Human Fetal Brain	Brain			Lambda ZAP II
H0175	H. Adult Spleen, ziplox					pSport1
H0176	CAMA1Ee Cell Line	CAMA1Ee Cell Line	Breast	Cell Line		Uni-ZAP XR
H0178	Human Fetal Brain	Human Fetal Brain	Brain			Uni-ZAP XR
H0179	Human Neutrophil	Human Neutrophil	Blood	Cell Line		Uni-ZAP XR
H0181	Human Primary Breast Cancer	Human Primary Breast Cancer	Breast		disease	Uni-ZAP XR
H0182	Human Primary Breast Cancer	Human Primary Breast Cancer	Breast		disease	Uni-ZAP XR
H0187	Resting T-Cell	T-Cells	Blood	Cell Line		Lambda ZAP II
H0188	Human Normal Breast	Human Normal Breast	Breast			Uni-ZAP XR
H0192	Cem Cells, cyclohexamide treated, subtra	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		Uni-ZAP XR
H0194	Human Cerebellum, subtracted	Human Cerebellum	Brain			pBluescript
H0196	Human Cardiomyopathy, subtracted	Human Cardiomyopathy	Heart			Uni-ZAP XR
H0201	Human Hippocampus, subtracted	Human Hippocampus	Brain			pBluescript
H0205	Human Colon Cancer, differential	Human Colon Cancer	Colon			pBluescript
H0208	Early Stage Human Lung, subtracted	Human Fetal Lung	Lung			pBluescript
H0212	Human Prostate, subtracted	Human Prostate	Prostate			pBluescript
H0213	Human Pituitary, subtracted	Human Pituitary				Uni-ZAP XR
H0214	Raji cells, cyclohexamide treated, subtracted	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		pBluescript
H0222	Activated T-Cells, 8 hrs, subtracted	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0229	Early Stage Human Brain, random primed	Early Stage Human Brain	Brain			Lambda ZAP II
H0230	Human Cardiomyopathy, diff exp	Human Cardiomyopathy	Heart		disease	Uni-ZAP XR
H0231	Human Colon, subtraction	Human Colon				pBluescript
H0239	Human Kidney Tumor	Human Kidney Tumor	Kidney		disease	Uni-ZAP XR

H0242	Human Fetal Heart, Differential (Fetal-Specific)	Human Fetal Heart	Heart			pBluescript
H0244	Human 8 Week Whole Embryo, subtracted	Human 8 Week Old Embryo	Embryo			Uni-ZAP XR
H0250	Human Activated Monocytes	Human Monocytes				Uni-ZAP XR
H0251	Human Chondrosarcoma	Human Chondrosarcoma	Cartilage		disease	Uni-ZAP XR
H0252	Human Osteosarcoma	Human Osteosarcoma	Bone		disease	Uni-ZAP XR
H0253	Human adult testis, large inserts	Human Adult Testis	Testis			Uni-ZAP XR
H0254	Breast Lymph node cDNA library	Breast Lymph Node	Lymph Node			Uni-ZAP XR
H0255	breast lymph node CDNA library	Breast Lymph Node	Lymph Node			Lambda ZAP II
H0261	H. cerebellum, Enzyme subtracted	Human Cerebellum	Brain			Uni-ZAP XR
H0263	human colon cancer	Human Colon Cancer	Colon		disease	Lambda ZAP II
H0264	human tonsils	Human Tonsil	Tonsil			Uni-ZAP XR
H0265	Activated T-Cell (12hs)/Thiouridine labelledEco	T-Cells	Blood	Cell Line		Uni-ZAP XR
H0266	Human Microvascular Endothelial Cells, fract. A	HMEC	Vein	Cell Line		Lambda ZAP II
H0268	Human Umbilical Vein Endothelial Cells, fract. A	HUVE Cells	Umbilical vein	Cell Line		Lambda ZAP II
H0269	Human Umbilical Vein Endothelial Cells, fract. B	HUVE Cells	Umbilical vein	Cell Line		Lambda ZAP II
H0270	HPAS (human pancreas, subtracted)	Human Pancreas	Pancreas			Uni-ZAP XR
H0271	Human Neutrophil, Activated	Human Neutrophil - Activated	Blood	Cell Line		Uni-ZAP XR
H0272	HUMAN TONSILS, FRACTION 2	Human Tonsil	Tonsil			Uni-ZAP XR
H0274	Human Adult Spleen, fractionII	Human Adult Spleen	Spleen			Uni-ZAP XR
H0280	K562 + PMA (36 hrs)	K562 Cell line	cell line	Cell Line		ZAP Express
H0284	Human OB MG63 control fraction I	Human Osteoblastoma MG63 cell line	Bone	Cell Line		Uni-ZAP XR
H0286	Human OB MG63 treated (10 nM E2) fraction I	Human Osteoblastoma MG63 cell line	Bone	Cell Line		Uni-ZAP XR
H0288	Human OB HOS control fraction I	Human Osteoblastoma HOS cell line	Bone	Cell Line		Uni-ZAP XR
H0290	Human OB HOS treated (1 nM E2) fraction I	Human Osteoblastoma HOS cell line	Bone	Cell Line		Uni-ZAP XR
H0292	Human OB HOS treated (10 nM E2) fraction I	Human Osteoblastoma HOS cell line	Bone	Cell Line		Uni-ZAP XR
H0293	WI 38 cells					Uni-ZAP XR
H0294	Amniotic Cells - TNF induced	Amniotic Cells - TNF induced	Placenta	Cell Line		Uni-ZAP XR
H0295	Amniotic Cells - Primary Culture	Amniotic Cells - Primary Culture	Placenta	Cell Line		Uni-ZAP XR
H0305	CD34 positive cells (Cord Blood)	CD34 Positive Cells	Cord Blood			ZAP Express
H0306	CD34 depleted Buffy Coat	CD34 Depleted	Cord Blood			ZAP Express

	(Cord Blood)	Buffy Coat (Cord Blood)				
H0309	Human Chronic Synovitis	Synovium, Chronic Synovitis/ Osteoarthritis	Synovium		disease	Uni-ZAP XR
H0310	human caudate nucleus	Brain	Brain			Uni-ZAP XR
H0316	HUMAN STOMACH	Human Stomach	Stomach			Uni-ZAP XR
H0318	HUMAN B CELL LYMPHOMA	Human B Cell Lymphoma	Lymph Node		disease	Uni-ZAP XR
H0320	Human frontal cortex	Human Frontal Cortex	Brain			Uni-ZAP XR
H0327	human corpus colosum	Human Corpus Callosum	Brain			Uni-ZAP XR
H0328	human ovarian cancer	Ovarian Cancer	Ovary		disease	Uni-ZAP XR
H0329	Dermatofibrosarcoma Protuberance	Dermatofibrosarcoma Protuberans	Skin		disease	Uni-ZAP XR
H0331	Hepatocellular Tumor	Hepatocellular Tumor	Liver		disease	Lambda ZAP II
H0333	Hemangiopericytoma	Hemangiopericytoma	Blood vessel		disease	Lambda ZAP II
H0334	Kidney cancer	Kidney Cancer	Kidney		disease	Uni-ZAP XR
H0339	Duodenum	Duodenum				Uni-ZAP XR
H0340	Corpus Callosum	Corpus Collosum-93052				Uni-ZAP XR
H0341	Bone Marrow Cell Line (RS4;11)	Bone Marrow Cell Line RS4;11	Bone Marrow	Cell Line		Uni-ZAP XR
H0343	stomach cancer (human)	Stomach Cancer - 5383A (human)			disease	Uni-ZAP XR
H0345	SKIN	Skin - 4000868H	Skin			Uni-ZAP XR
H0349	human adult liver cDNA library	Human Adult Liver	Liver			pCMVSPORT 1
H0351	Glioblastoma	Glioblastoma	Brain		disease	Uni-ZAP XR
H0352	wilm's tumor	Wilm's Tumor			disease	Uni-ZAP XR
H0355	Human Liver	Human Liver, normal Adult				pCMVSPORT 1
H0359	KMH2 cell line	KMH2				ZAP Express
H0361	Human rejected kidney	Human Rejected Kidney			disease	pBluescript
H0364	Human Osteoclastoma, excised	Human Osteoclastoma			disease	pBluescript
H0369	H. Atrophic Endometrium	Atrophic Endometrium and myometrium				Uni-ZAP XR
H0370	H. Lymph node breast Cancer	Lymph node with Met. Breast Cancer			disease	Uni-ZAP XR
H0373	Human Heart	Human Adult Heart	Heart			pCMVSPORT 1
H0374	Human Brain	Human Brain				pCMVSPORT 1
H0375	Human Lung	Human Lung				pCMVSPORT 1
H0379	Human Tongue, frac 1	Human Tongue				pSPORT 1
H0386	Leukocyte and Lung; 4 screens	Human Leukocytes	Blood	Cell Line		pCMVSPORT 1
H0390	Human Amygdala Depression, re-excision	Human Amygdala Depression			disease	pBluescript
H0391	H. Meningioma, M6	Human Meningioma	brain			pSPORT 1
H0392	H. Meningioma, M1	Human Meningioma	brain			pSPORT 1
H0393	Fetal Liver, subtraction II	Human Fetal Liver	Liver			pBluescript
H0394	A-14 cell line	Redd-Sternberg cell				ZAP Express
H0395	A1-CELL LINE	Redd-Sternberg cell				ZAP Express
H0396	L1 Cell line	Redd-Sternberg cell				ZAP Express

H0399	Human Kidney Cortex, re-rescue	Human Kidney Cortex				Lambda ZAP II
H0402	CD34 depleted Buffy Coat (Cord Blood), re-excision	CD34 Depleted Buffy Coat (Cord Blood)	Cord Blood			ZAP Express
H0403	H. Umbilical Vein Endothelial Cells, IL4 induced	HUVE Cells	Umbilical vein	Cell Line		Uni-ZAP XR
H0404	H. Umbilical Vein endothelial cells, uninduced	HUVE Cells	Umbilical vein	Cell Line		Uni-ZAP XR
H0409	H. Striatum Depression, subtracted	Human Brain, Striatum Depression	Brain			pBluescript
H0411	H Female Bladder, Adult	Human Female Adult Bladder	Bladder			pSport I
H0412	Human umbilical vein endothelial cells, IL-4 induced	HUVE Cells	Umbilical vein	Cell Line		pSport I
H0413	Human Umbilical Vein Endothelial Cells, uninduced	HUVE Cells	Umbilical vein	Cell Line		pSport I
H0414	Ovarian Tumor I, OV5232	Ovarian Tumor, OV5232	Ovary		disease	pSport I
H0415	H. Ovarian Tumor, II, OV5232	Ovarian Tumor, OV5232	Ovary		disease	pCMV Sport 2.0
H0416	Human Neutrophils, Activated, re-excision	Human Neutrophil - Activated	Blood	Cell Line		pBluescript
H0421	Human Bone Marrow, re-excision	Bone Marrow				pBluescript
H0422	T-Cell PHA 16 hrs	T-Cells	Blood	Cell Line		pSport I
H0423	T-Cell PHA 24 hrs	T-Cells	Blood	Cell Line		pSport I
H0424	Human Pituitary, subt IX	Human Pituitary				pBluescript
H0427	Human Adipose	Human Adipose, left hiplipoma				pSport I
H0428	Human Ovary	Human Ovary Tumor	Ovary			pSport I
H0429	K562 + PMA (36 hrs), re-excision	K562 Cell line	cell line	Cell Line		ZAP Express
H0431	H. Kidney Medulla, re-excision	Kidney medulla	Kidney			pBluescript
H0433	Human Umbilical Vein Endothelial cells, frac B, re-excision	HUVE Cells	Umbilical vein	Cell Line		pBluescript
H0434	Human Brain, striatum, re-excision	Human Brain, Striatum				pBluescript
H0435	Ovarian Tumor 10-3-95	Ovarian Tumor, OV350721	Ovary			pCMV Sport 2.0
H0436	Resting T-Cell Library, II	T-Cells	Blood	Cell Line		pSport I
H0437	H Umbilical Vein Endothelial Cells, frac A, re-excision	HUVE Cells	Umbilical vein	Cell Line		Lambda ZAP II
H0438	H. Whole Brain #2, re-excision	Human Whole Brain #2				ZAP Express
H0441	H. Kidney Cortex, subtracted	Kidney cortex	Kidney			pBluescript
H0444	Spleen metastatic melanoma	Spleen, Metastatic malignant melanoma	Spleen		disease	pSport I
H0445	Spleen, Chronic lymphocytic leukemia	Human Spleen, CLL	Spleen		disease	pSport I
H0455	H. Striatum Depression, subt	Human Brain, Striatum Depression	Brain			pBluescript
H0456	H Kidney Cortex,	Human Kidney				pBluescript

	subtracted III	Cortex				
H0457	Human Eosinophils	Human Eosinophils				pSport1
H0459	CD34+cells, II, FRACTION 2	CD34 positive cells				pCMVSPORT 2.0
H0477	Human Tonsil, Lib 3	Human Tonsil	Tonsil			pSport1
H0478	Salivary Gland, Lib 2	Human Salivary Gland	Salivary gland			pSport1
H0479	Salivary Gland, Lib 3	Human Salivary Gland	Salivary gland			pSport1
H0483	Breast Cancer cell line, MDA 36	Breast Cancer Cell line, MDA 36				pSport1
H0484	Breast Cancer Cell line, angiogenic	Breast Cancer Cell line, Angiogenic, 36T3				pSport1
H0485	Hodgkin's Lymphoma I	Hodgkin's Lymphoma I			disease	pCMVSPORT 2.0
H0486	Hodgkin's Lymphoma II	Hodgkin's Lymphoma II			disease	pCMVSPORT 2.0
H0487	Human Tonsils, lib I	Human Tonsils				pCMVSPORT 2.0
H0488	Human Tonsils, Lib 2	Human Tonsils				pCMVSPORT 2.0
H0489	Crohn's Disease	Ileum	Intestine		disease	pSport1
H0494	Keratinocyte	Keratinocyte				pCMVSPORT 2.0
H0497	HEL cell line	HEL cell line		HEL 92.1.7		pSport1
H0505	Human Astrocyte	Human Astrocyte				pSport1
H0506	Ulcerative Colitis	Colon	Colon			pSport1
H0509	Liver, Hepatoma	Human Liver, Hepatoma, patient 8	Liver		disease	pCMVSPORT 3.0
H0510	Human Liver, normal	Human Liver, normal, Patient # 8	Liver			pCMVSPORT 3.0
H0517	Nasal polyps	Nasal polyps				pCMVSPORT 2.0
H0518	pBMC stimulated w/ poly I/C	pBMC stimulated with poly I/C				pCMVSPORT 3.0
H0519	NTERA2, control	NTERA2, Teratocarcinoma cell line				pCMVSPORT 3.0
H0520	NTERA2 + retinoic acid, 14 days	NTERA2, Teratocarcinoma cell line				pSport1
H0521	Primary Dendritic Cells, lib 1	Primary Dendritic cells				pCMVSPORT 3.0
H0522	Primary Dendritic cells, frac 2	Primary Dendritic cells				pCMVSPORT 3.0
H0528	Poly[I]/Poly[C] Normal Lung Fibroblasts	Poly[I]/Poly[C] Normal Lung Fibroblasts				pCMVSPORT 3.0
H0529	Myeloid Progenitor Cell Line	TF-1 Cell Line; Myeloid progenitor cell line				pCMVSPORT 3.0
H0530	Human Dermal Endothelial Cells, untreated	Human Dermal Endothelial Cells; untreated				pSport1
H0538	Merkel Cells	Merkel cells	Lymph node			pSport1
H0539	Pancreas Islet Cell Tumor	Pancreas Islet Cell Tumour	Pancreas		disease	pSport1
H0540	Skin, burned	Skin, leg burned	Skin			pSport1
H0542	T Cell helper I	Helper T cell				pCMVSPORT 3.0

H0543	T cell helper II	Helper T cell				pCMVSPORT 3.0
H0544	Human endometrial stromal cells	Human endometrial stromal cells				pCMVSPORT 3.0
H0545	Human endometrial stromal cells-treated with progesterone	Human endometrial stromal cells-treated with proge				pCMVSPORT 3.0
H0546	Human endometrial stromal cells-treated with estradiol	Human endometrial stromal cells-treated with cstra				pCMVSPORT 3.0
H0547	NTERA2 teratocarcinoma cell line+retinoic acid (14 days)	NTERA2, Teratocarcinoma cell line				pSPORT I
H0549	H. Epididymus, caput & corpus	Human Epididymus, caput and corpus				Uni-ZAP XR
H0550	H. Epididymus, cauda	Human Epididymus, cauda				Uni-ZAP XR
H0551	Human Thymus Stromal Cells	Human Thymus Stromal Cells				pCMVSPORT 3.0
H0553	Human Placenta	Human Placenta				pCMVSPORT 3.0
H0555	Rejected Kidney, lib 4	Human Rejected Kidney	Kidney		disease	pCMVSPORT 3.0
H0556	Activated T-cell(12h)/Thiouridine-re-excision	T-Cells	Blood	Cell Line		Uni-ZAP XR
H0559	HL-60, PMA 4H, re-excision	HL-60 Cells, PMA stimulated 4H	Blood	Cell Line		Uni-ZAP XR
H0560	KMH2	KMH2				pCMVSPORT 3.0
H0561	L428	L428				pCMVSPORT 3.0
H0562	Human Fetal Brain, normalized c5-11-26	Human Fetal Brain				pCMVSPORT 2.0
H0563	Human Fetal Brain, normalized 50021F	Human Fetal Brain				pCMVSPORT 2.0
H0564	Human Fetal Brain, normalized C5001F	Human Fetal Brain				pCMVSPORT 2.0
H0566	Human Fetal Brain,normalized c50F	Human Fetal Brain				pCMVSPORT 2.0
H0569	Human Fetal Brain, normalized CO	Human Fetal Brain				pCMVSPORT 2.0
H0570	Human Fetal Brain, normalized C500H	Human Fetal Brain				pCMVSPORT 2.0
H0571	Human Fetal Brain, normalized C500HE	Human Fetal Brain				pCMVSPORT 2.0
H0572	Human Fetal Brain, normalized AC5002	Human Fetal Brain				pCMVSPORT 2.0
H0574	Hepatocellular Tumor; re-excision	Hepatocellular Tumor	Liver		disease	Lambda ZAP II
H0575	Human Adult Pulmonary;re-excision	Human Adult Pulmonary	Lung			Uni-ZAP XR
H0576	Resting T-Cell; re-excision	T-Cells	Blood	Cell Line		Lambda ZAP II
H0579	Pericardium	Pericardium	Heart			pSPORT I
H0580	Dendritic cells, pooled	Pooled dendritic cells				pCMVSPORT 3.0
H0581	Human Bone Marrow, treated	Human Bone Marrow	Bone Marrow			pCMVSPORT 3.0
H0583	B Cell lymphoma	B Cell Lymphoma	B Cell		disease	pCMVSPORT 3.0
H0586	Healing groin wound, 6.5	healing groin	groin		disease	pCMVSPORT

	hours post incision	wound, 6.5 hours post incision - 2/				3.0
H0587	Healing groin wound; 7.5 hours post incision	Groin-2/19/97	groin		disease	pCMVSPORT 3.0
H0589	CD34 positive cells (cord blood),re-ex	CD34 Positive Cells	Cord Blood			ZAP Express
H0590	Human adult small intestine,re-excision	Human Adult Small Intestine	Small Int.			Uni-ZAP XR
H0591	Human T-cell lymphoma;re-excision	T-Cell Lymphoma	T-Cell		disease	Uni-ZAP XR
H0592	Healing groin wound - zero hr post-incision (control)	HGS wound healing project; abdomen			disease	pCMVSPORT 3.0
H0593	Olfactory epithelium;nasalcavity	Olfactory epithelium from roof of left nasal cavity				pCMVSPORT 3.0
H0594	Human Lung Cancer;re-excision	Human Lung Cancer	Lung		disease	Lambda ZAP II
H0595	Stomach cancer (human);re-excision	Stomach Cancer - 5383A (human)			disease	Uni-ZAP XR
H0596	Human Colon Cancer;re-excision	Human Colon Cancer	Colon			Lambda ZAP II
H0597	Human Colon; re-excision	Human Colon				Lambda ZAP II
H0598	Human Stomach;re-excision	Human Stomach	Stomach			Uni-ZAP XR
H0599	Human Adult Heart;re-excision	Human Adult Heart	Heart			Uni-ZAP XR
H0600	Healing Abdomen wound;70&90 min post incision	Abdomen			disease	pCMVSPORT 3.0
H0601	Healing Abdomen Wound;15 days post incision	Abdomen			disease	pCMVSPORT 3.0
H0604	Human Pituitary, re-excision	Human Pituitary				pBluescript
H0606	Human Primary Breast Cancer;re-excision	Human Primary Breast Cancer	Breast		disease	Uni-ZAP XR
H0608	H. Leukocytes, control	H.Leukocytes				pCMVSPORT 1
H0609	H. Leukocytes, normalized cot > 500A	H.Leukocytes				pCMVSPORT 1
H0614	H. Leukocytes, normalized cot 500 A	H.Leukocytes				pCMVSPORT 1
H0615	Human Ovarian Cancer Reexcision	Ovarian Cancer	Ovary		disease	Uni-ZAP XR
H0616	Human Testes, Reexcision	Human Testes	Testis			Uni-ZAP XR
H0617	Human Primary Breast Cancer Reexcision	Human Primary Breast Cancer	Breast		disease	Uni-ZAP XR
H0618	Human Adult Testes, Large Inserts, Reexcision	Human Adult Testis	Testis			Uni-ZAP XR
H0619	Fetal Heart	Human Fetal Heart	Heart			Uni-ZAP XR
H0620	Human Fetal Kidney; Reexcision	Human Fetal Kidney	Kidney			Uni-ZAP XR
H0622	Human Pancreas Tumor; Reexcision	Human Pancreas Tumor	Pancreas		disease	Uni-ZAP XR
H0623	Human Umbilical Vein; Reexcision	Human Umbilical Vein Endothelial Cells	Umbilical vein			Uni-ZAP XR
H0624	12 Week Early Stage Human II; Reexcision	Twelve Week Old Early Stage Human	Embryo			Uni-ZAP XR
H0625	Ku 812F Basophils Line	Ku 812F Basophils				pSPORT 1
H0626	Saos2 Cells; Untreated	Saos2 Cell Line;				pSPORT 1





	Papillary Carcinoma					
H0660	Ovary, Cancer: (15799A1F) Poorly differentiated carcinoma	Poorly differentiated carcinoma, ovary			disease	pSport1
H0661	Breast, Cancer: (4004943 A5)	Breast cancer			disease	pSport1
H0662	Breast, Normal: (4005522B2)	Normal Breast - #4005522(B2)	Breast			pSport1
H0663	Breast, Cancer: (4005522 A2)	Breast Cancer - #4005522(A2)	Breast		disease	pSport1
H0664	Breast, Cancer: (9806C012R)	Breast Cancer	Breast		disease	pSport1
H0665	Stromal cells 3.88	Stromal cells 3.88				pSport1
H0666	Ovary, Cancer: (4004332 A2)	Ovarian Cancer, Sample #4004332A2			disease	pSport1
H0667	Stromal cells(HBM3.18)	Stromal cell(HBM 3.18)				pSport1
H0668	stromal cell clone 2.5	stromal cell clone 2.5				pSport1
H0670	Ovary, Cancer(4004650 A3): Well-Differentiated Micropapillary Serous Carcinoma	Ovarian Cancer - 4004650A3				pSport1
H0672	Ovary, Cancer: (4004576 A8)	Ovarian Cancer(4004576A8)	Ovary			pSport1
H0673	Human Prostate Cancer, Stage B2; re-excision	Human Prostate Cancer, stage B2	Prostate			Uni-ZAP XR
H0674	Human Prostate Cancer, Stage C; re-excision	Human Prostate Cancer, stage C	Prostate			Uni-ZAP XR
H0675	Colon, Cancer: (9808C064R)	Colon Cancer 9808C064R				pCMVSPORT 3.0
H0676	Colon, Cancer: (9808C064R)-total RNA	Colon Cancer 9808C064R				pCMVSPORT 3.0
H0677	TNFR degenerate oligo	B-Cells				PCR11
H0682	Serous Papillary Adenocarcinoma	serous papillary adenocarcinoma (9606G304SPA3B)				pCMVSPORT 3.0
H0683	Ovarian Serous Papillary Adenocarcinoma	Serous papillary adenocarcinoma, stage 3C (9804G01				pCMVSPORT 3.0
H0684	Serous Papillary Adenocarcinoma	Ovarian Cancer- 9810G606	Ovaries			pCMVSPORT 3.0
H0685	Adenocarcinoma of Ovary, Human Cell Line, # OVCAR-3	Adenocarcinoma of Ovary, Human Cell Line, # OVCAR-				pCMVSPORT 3.0
H0686	Adenocarcinoma of Ovary, Human Cell Line	Adenocarcinoma of Ovary, Human Cell Line, # SW-626				pCMVSPORT 3.0
H0687	Human normal ovary(#9610G215)	Human normal ovary(#9610G215)	Ovary			pCMVSPORT 3.0
H0688	Human Ovarian Cancer(#9807G017)	Human Ovarian cancer(#9807G017), mRNA from Maura Ru				pCMVSPORT 3.0
H0689	Ovarian Cancer	Ovarian Cancer, #9806G019				pCMVSPORT 3.0
H0690	Ovarian Cancer, # 9702G001	Ovarian Cancer, #9702G001				pCMVSPORT 3.0
H0692	BLyS Receptor from Expression Cloning	B Cell Lymphoma	B Cell			pCMVSPORT 3.0
H0693	Normal Prostate #ODQ3958EN	Normal Prostate Tissue #				pCMVSPORT 3.0

		ODQ3958EN				
H0695	mononucleocytes from patient	mononucleocytes from patient at Shady Grove Hospit				pCMVSPORT 3.0
N0006	Human Fetal Brain	Human Fetal Brain				
S0001	Brain frontal cortex	Brain frontal cortex	Brain			Lambda ZAP II
S0002	Monocyte activated	Monocyte-activated	blood	Cell Line		Uni-ZAP XR
S0003	Human Osteoclastoma	Osteoclastoma	bone		disease	Uni-ZAP XR
S0005	Heart	Heart-left ventricle	Heart			pCDNA
S0007	Early Stage Human Brain	Human Fetal Brain				Uni-ZAP XR
S0010	Human Amygdala	Amygdala				Uni-ZAP XR
S0011	STROMAL - OSTEOCLASTOMA	Osteoclastoma	bone		disease	Uni-ZAP XR
S0013	Prostate	Prostate	prostate			Uni-ZAP XR
S0014	Kidney Cortex	Kidney cortex	Kidney			Uni-ZAP XR
S0022	Human Osteoclastoma Stromal Cells - unamplified	Osteoclastoma Stromal Cells				Uni-ZAP XR
S0023	Human Kidney Cortex - unamplified	Human Kidney Cortex				
S0024	Human Kidney Medulla - unamplified	Human Kidney Medulla				
S0026	Stromal cell TF274	stromal cell	Bone marrow	Cell Line		Uni-ZAP XR
S0027	Smooth muscle, serum treated	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0028	Smooth muscle, control	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0029	brain stem	Brain stem	brain			Uni-ZAP XR
S0030	Brain pons	Brain Pons	Brain			Uni-ZAP XR
S0031	Spinal cord	Spinal cord	spinal cord			Uni-ZAP XR
S0032	Smooth muscle-ILb induced	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0036	Human Substantia Nigra	Human Substantia Nigra				Uni-ZAP XR
S0037	Smooth muscle, IL1b induced	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0038	Human Whole Brain #2 - Oligo dT > 1.5Kb	Human Whole Brain #2				ZAP Express
S0040	Adipocytes	Human Adipocytes from Osteoclastoma				Uni-ZAP XR
S0042	Testes	Human Testes				ZAP Express
S0044	Prostate BPH	prostate BPH	Prostate		disease	Uni-ZAP XR
S0045	Endothelial cells-control	Endothelial cell	endothelial cell-lung	Cell Line		Uni-ZAP XR
S0046	Endothelial-induced	Endothelial cell	endothelial cell-lung	Cell Line		Uni-ZAP XR
S0049	Human Brain, Striatum	Human Brain, Striatum				Uni-ZAP XR
S0050	Human Frontal Cortex, Schizophrenia	Human Frontal Cortex, Schizophrenia			disease	Uni-ZAP XR
S0051	Human Hypothalamus, Schizophrenia	Human Hypothalamus, Schizophrenia			disease	Uni-ZAP XR
S0052	neutrophils control	human neutrophils	blood	Cell Line		Uni-ZAP XR
S0053	Neutrophils IL-1 and LPS induced	human neutrophil induced	blood	Cell Line		Uni-ZAP XR
S0106	STRIATUM DEPRESSION		BRAIN		disease	Uni-ZAP XR
S0112	Hypothalamus		Brain			Uni-ZAP XR
S0114	Anergic T-cell	Anergic T-cell		Cell Line		Uni-ZAP XR

S0116	Bone marrow	Bone marrow	Bone marrow			Uni-ZAP XR
S0122	Osteoclastoma-normalized A	Osteoclastoma	bone		disease	pBluescript
S0126	Osteoblasts	Osteoblasts	Knee	Cell Line		Uni-ZAP XR
S0132	Epithelial-TNF $\alpha$ and INF induced	Airway Epithelial				Uni-ZAP XR
S0134	Apoptotic T-cell	apoptotic cells		Cell Line		Uni-ZAP XR
S0136	PERM TF274	stromal cell	Bone marrow	Cell Line		Lambda ZAP II
S0142	Macrophage-oxLDL	macrophage-oxidized LDL treated	blood	Cell Line		Uni-ZAP XR
S0144	Macrophage (GM-CSF treated)	Macrophage (GM-CSF treated)				Uni-ZAP XR
S0146	prostate-edited	prostate BPH	Prostate			Uni-ZAP XR
S0148	Normal Prostate	Prostate	prostate			Uni-ZAP XR
S0150	LNCAP prostate cell line	LNCAP Cell Line	Prostate	Cell Line		Uni-ZAP XR
S0152	PC3 Prostate cell line	PC3 prostate cell line				Uni-ZAP XR
S0168	Prostate/LNCAP, subtraction I	PC3 prostate cell line				pBluescript
S0174	Prostate-BPH subtracted II	Human Prostate BPH				pBluescript
S0182	Human B Cell 8866	Human B- Cell 8866				Uni-ZAP XR
S0192	Synovial Fibroblasts (control)	Synovial Fibroblasts				pSportI
S0194	Synovial hypoxia	Synovial Fibroblasts				pSportI
S0196	Synovial IL-1/TNF stimulated	Synovial Fibroblasts				pSportI
S0198	7TM-pbfd	PBLS, 7TM receptor enriched				PCRII
S0206	Smooth Muscle- HASTE normalized	Smooth muscle	Pulmonary artery	Cell Line		pBluescript
S0208	Messangial cell, frac 1	Messangial cell				pSportI
S0210	Messangial cell, frac 2	Messangial cell				pSportI
S0212	Bone Marrow Stromal Cell, untreated	Bone Marrow Stromal Cell, untreated				pSportI
S0214	Human Osteoclastoma, re-excision	Osteoclastoma	bone		disease	Uni-ZAP XR
S0216	Neutrophils IL-1 and LPS induced	human neutrophil induced	blood	Cell Line		Uni-ZAP XR
S0218	Apoptotic T-cell, re-excision	apoptotic cells		Cell Line		Uni-ZAP XR
S0220	H. hypothalamus, frac A; re-excision	Hypothalamus	Brain			ZAP Express
S0222	H. Frontal cortex, epileptic; re-excision	H. Brain, Frontal Cortex, Epileptic	Brain		disease	Uni-ZAP XR
S0228	PSMIX	PBLS, 7TM receptor enriched				PCRII
S0242	Synovial Fibroblasts (III/TNF), subt	Synovial Fibroblasts				pSportI
S0250	Human Osteoblasts II	Human Osteoblasts	Femur		disease	pCMVSPORT 2.0
S0252	7TM-PIMIX	PBLS, 7TM receptor enriched				PCRII
S0260	Spinal Cord, re-excision	Spinal cord	spinal cord			Uni-ZAP XR
S0264	PPMIX	PPMIX (Human Pituitary)	Pituitary			PCRII
S0268	PRMIX	PRMIX (Human Prostate)	prostate			PCRII

S0270	PTMIX	PTMIX (Human Thymus)	Thymus			PCRII
S0274	PCMIX	PCMIX (Human Cerebellum)	Brain			PCRII
S0276	Synovial hypoxia-RSF subtracted	Synovial fobroblasts (rheumatoid)	Synovial tissue			pSportI
S0278	H Macrophage (GM-CSF treated), re-excision	Macrophage (GM-CSF treated)				Uni-ZAP XR
S0280	Human Adipose Tissue, re-excision	Human Adipose Tissue				Uni-ZAP XR
S0282	Brain Frontal Cortex, re-excision	Brain frontal cortex	Brain			Lambda ZAP II
S0294	Larynx tumor	Larynx tumor	Larynx,vocal cord		disease	pSportI
S0298	Bone marrow stroma,treated	Bone marrow stroma,treatedSB	Bone marrow			pSportI
S0300	Frontal lobe,dementia;re-excision	Frontal Lobe dementia/Alzheimer' 's	Brain			Uni-ZAP XR
S0306	Larynx normal #10 261-273	Larynx normal				pSportI
S0308	Spleen/normal	Spleen normal				pSportI
S0310	Normal trachea	Normal trachea				pSportI
S0312	Human osteoarthritic;fraction II	Human osteoarthritic cartilage			disease	pSportI
S0314	Human osteoarthritis;fraction I	Human osteoarthritic cartilage			disease	pSportI
S0316	Human Normal Cartilage,Fraction I	Human Normal Cartilage				pSportI
S0318	Human Normal Cartilage Fraction II	Human Normal Cartilage				pSportI
S0328	Palate carcinoma	Palate carcinoma	Uvula		disease	pSportI
S0330	Palate normal	Palate normal	Uvula			pSportI
S0332	Pharynx carcinoma	Pharynx carcinoma	Hypopharynx			pSportI
S0334	Human Normal Cartilage Fraction III	Human Normal Cartilage				pSportI
S0338	Human Osteoarthritic Cartilage Fraction III	Human osteoarthritic cartilage			disease	pSportI
S0340	Human Osteoarthritic Cartilage Fraction IV	Human osteoarthritic cartilage			disease	pSportI
S0342	Adipocytes;re-excision	Human Adipocytes from Osteoclastoma				Uni-ZAP XR
S0344	Macrophage-oxLDL; re-excision	macrophage-oxidized LDL treated	blood	Cell Line		Uni-ZAP XR
S0346	Human Amygdala;re-excision	Amygdala				Uni-ZAP XR
S0350	Pharynx Carcinoma	Pharynx carcinoma	Hypopharynx		disease	pSportI
S0352	Larynx Carcinoma	Larynx carcinoma			disease	pSportI
S0354	Colon Normal II	Colon Normal	Colon			pSportI
S0356	Colon Carcinoma	Colon Carcinoma	Colon		disease	pSportI
S0358	Colon Normal III	Colon Normal	Colon			pSportI
S0360	Colon Tumor II	Colon Tumor	Colon		disease	pSportI
S0362	Human Gastrocnemius	Gastrocnemius muscle				pSportI
S0364	Human Quadriceps	Quadriceps muscle				pSportI
S0366	Human Soleus	Soleus Muscle				pSportI
S0370	Larynx carcinoma II	Larynx carcinoma			disease	pSportI

S0374	Normal colon	Normal colon				pSport1
S0376	Colon Tumor	Colon Tumor			disease	pSport1
S0378	Pancreas normal PCA4 No	Pancreas Normal PCA4 No				pSport1
S0380	Pancreas Tumor PCA4 Tu	Pancreas Tumor PCA4 Tu			disease	pSport1
S0386	Human Whole Brain, re-excision	Whole brain	Brain			ZAP Express
S0388	Human Hypothalamus, schizophrenia, re-excision	Human Hypothalamus, Schizophrenia			disease	Uni-ZAP XR
S0390	Smooth muscle, control; re-excision	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0392	Salivary Gland	Salivary gland; normal				pSport1
S0400	Brain; normal	Brain; normal				pSport1
S0404	Rectum normal	Rectum, normal				pSport1
S0406	Rectum tumour	Rectum tumour				pSport1
S0408	Colon, normal	Colon, normal				pSport1
S0410	Colon, tumour	Colon, tumour				pSport1
S0412	Temporal cortex-Alzheimer; subtracted	Temporal cortex, alzheimer			disease	Other
S0414	Hippocampus, Alzheimer Subtracted	Hippocampus, Alzheimer Subtracted				Other
S0418	CHME Cell Line;treated 5 hrs	CHME Cell Line; treated				pCMVSPORT 3.0
S0420	CHME Cell Line,untreated	CHME Cell line, untreated				pSport1
S0422	Mo7e Cell Line GM-CSF treated (1ng/ml)	Mo7e Cell Line GM-CSF treated (1ng/ml)				pCMVSPORT 3.0
S0424	TF-1 Cell Line GM-CSF Treated	TF-1 Cell Line GM-CSF Treated				pSport1
S0426	Monocyte activated; re-excision	Monocyte-activated	blood	Cell Line		Uni-ZAP XR
S0428	Neutrophils control; re-excision	human neutrophils	blood	Cell Line		Uni-ZAP XR
S0430	Aryepiglottis Normal	Aryepiglottis Normal				pSport1
S0432	Sinus piniformis Tumour	Sinus piniformis Tumour				pSport1
S0434	Stomach Normal	Stomach Normal			disease	pSport1
S0436	Stomach Tumour	Stomach Tumour			disease	pSport1
S0438	Liver Normal Met5No	Liver Normal Met5No				pSport1
S0440	Liver Tumour Met 5 Tu	Liver Tumour				pSport1
S0442	Colon Normal	Colon Normal				pSport1
S0444	Colon Tumor	Colon Tumour			disease	pSport1
S0446	Tongue Tumour	Tongue Tumour				pSport1
S0448	Larynx Normal	Larynx Normal				pSport1
S0450	Larynx Tumour	Larynx Tumour				pSport1
S0452	Thymus	Thymus				pSport1
S0456	Tongue Normal	Tongue Normal				pSport1
S0458	Thyroid Normal (SDCA2 No)	Thyroid normal				pSport1
S0460	Thyroid Tumour	Thyroid Tumour				pSport1
S0462	Thyroid Thyroiditis	Thyroid Thyroiditis				pSport1
S0464	Larynx Normal	Larynx Normal				pSport1
S0468	Ea.hy.926 cell line	Ea.hy.926 cell line				pSport1
S0472	Lung Mesothelium	PYBT				pSport1
S0474	Human blood platelets	Platelets	Blood			Other

			platelets			
S0665	Human Amygdala; re-excision	Amygdala				Uni-ZAP XR
S3012	Smooth Muscle Serum Treated, Norm	Smooth muscle	Pulmonary artery	Cell Line		pBluescript
S3014	Smooth muscle, serum induced, re-exc	Smooth muscle	Pulmonary artery	Cell Line		pBluescript
S6014	H. hypothalamus, frac A	Hypothalamus	Brain			ZAP Express
S6016	H. Frontal Cortex, Epileptic	H. Brain, Frontal Cortex, Epileptic	Brain		disease	Uni-ZAP XR
S6022	H. Adipose Tissue	Human Adipose Tissue				Uni-ZAP XR
S6024	Alzheimers, spongy change	Alzheimer's/Spongy change	Brain		disease	Uni-ZAP XR
S6026	Frontal Lobe, Dementia	Frontal Lobe dementia/Alzheimer's	Brain			Uni-ZAP XR
S6028	Human Manic Depression Tissue	Human Manic depression tissue	Brain		disease	Uni-ZAP XR
T0002	Activated T-cells	Activated T-Cell, PBL fraction	Blood	Cell Line		pBluescript SK-
T0003	Human Fetal Lung	Human Fetal Lung				pBluescript SK-
T0004	Human White Fat	Human White Fat				pBluescript SK-
T0006	Human Pineal Gland	Human Pineal Gland				pBluescript SK-
T0008	Colorectal Tumor	Colorectal Tumor			disease	pBluescript SK-
T0010	Human Infant Brain	Human Infant Brain				Other
T0023	Human Pancreatic Carcinoma	Human Pancreatic Carcinoma			disease	pBluescript SK-
T0039	HSA 172 Cells	Human HSA172 cell line				pBluescript SK-
T0040	HSC172 cells	SA172 Cells				pBluescript SK-
T0041	Jurkat T-cell G1 phase	Jurkat T-cell				pBluescript SK-
T0042	Jurkat T-Cell, S phase	Jurkat T-Cell Line				pBluescript SK-
T0048	Human Aortic Endothelium	Human Aortic Endothelium				pBluescript SK-
T0049	Aorta endothelial cells + TNF-a	Aorta endothelial cells				pBluescript SK-
T0060	Human White Adipose	Human White Fat				pBluescript SK-
T0067	Human Thyroid	Human Thyroid				pBluescript SK-
T0068	Normal Ovary, Premenopausal	Normal Ovary, Premenopausal				pBluescript SK-
T0069	Human Uterus, normal	Human Uterus, normal				pBluescript SK-
T0071	Human Bone Marrow	Human Bone Marrow				pBluescript SK-
T0082	Human Adult Retina	Human Adult Retina				pBluescript SK-
T0109	Human (HCC) cell line liver (mouse) metastasis, remake					pBluescript SK-
T0110	Human colon carcinoma (HCC) cell line, remake					pBluescript SK-
T0114	Human (Caco-2) cell line,					pBluescript

	adenocarcinoma, colon, remake					SK-
T0115	Human Colon Carcinoma (HCC) cell line					pBluescript SK-
L0002	Atrium cDNA library Human heart					
L0004	ClonTech HL 1065a					
L0005	Clontech human aorta polyA+ mRNA (#6572)					
L0015	Human					
L0021	Human adult (K.Okubo)					
L0022	Human adult lung 3" directed MboI cDNA					
L0040	Human colon mucosa					
L0053	Human pancreatic tumor					
L0055	Human promyelocyte					
L0096	Subtracted human retina					
L0097	Subtracted human retinal pigment epithelium (RPE)					
L0103	DKFZphamyl	amygdala				
L0105	Human aorta polyA+ (TFujiwara)	aorta				
L0109	Human brain cDNA	brain				
L0118	Human fetal brain S. Meier-Ewert	brain				
L0142	Human placenta cDNA (TFujiwara)	placenta				
L0143	Human placenta polyA+ (TFujiwara)	placenta				
L0151	Human testis (C. De Smet)	testis				
L0157	Human fetal brain (TFujiwara)		brain			
L0163	Human heart cDNA (YNakamura)		heart			
L0351	Infant brain, Bento Soares					BA, M13-derived
L0352	Normalized infant brain, Bento Soares					BA, M13-derived
L0356	S, Human foetal Adrenals tissue					Bluescript
L0361	Stratagene ovary (#937217)		ovary			Bluescript SK
L0362	Stratagene ovarian cancer (#937219)					Bluescript SK-
L0363	NCI_CGAP_GC2	germ cell tumor				Bluescript SK-
L0364	NCI_CGAP_GC5	germ cell tumor				Bluescript SK-
L0365	NCI_CGAP_Phe1	pheochromocytoma				Bluescript SK-
L0366	Stratagene schizo brain S11	schizophrenic brain S-11 frontal lobe				Bluescript SK-
L0367	NCI_CGAP_Sch1	Schwannoma tumor				Bluescript SK-
L0368	NCI_CGAP_SS1	synovial sarcoma				Bluescript SK-
L0369	NCI_CGAP_AA1	adrenal adenoma	adrenal gland			Bluescript SK-
L0370	Johnston frontal cortex	pooled frontal lobe	brain			Bluescript SK-
L0371	NCI_CGAP_Br3	breast tumor	breast			Bluescript





L0518	NCI CGAP Pr2					pAMP10
L0519	NCI CGAP Pr3					pAMP10
L0520	NCI CGAP Alvl	alveolar rhabdomyosarcoma				pAMP10
L0521	NCI CGAP Ew1	Ewing's sarcoma				pAMP10
L0523	NCI CGAP Lip2	liposarcoma				pAMP10
L0526	NCI CGAP Pr12	metastatic prostate bone lesion				pAMP10
L0527	NCI CGAP Ov2	ovary				pAMP10
L0528	NCI CGAP Pr5	prostate				pAMP10
L0529	NCI CGAP Pr6	prostate				pAMP10
L0530	NCI CGAP Pr8	prostate				pAMP10
L0533	NCI CGAP HSC1	stem cells	bone marrow			pAMP10
L0534	Chromosome 7 Fetal Brain cDNA Library	brain	brain			pAMP10
L0540	NCI CGAP Pr10	invasive prostate tumor	prostate			pAMP10
L0542	NCI CGAP Pr11	normal prostatic epithelial cells	prostate			pAMP10
L0545	NCI CGAP Pr4.1	prostatic intraepithelial neoplasia - high grade	prostate			pAMP10
L0546	NCI CGAP Pr18	stroma	prostate			pAMP10
L0547	NCI CGAP Pr16	tumor	prostate			pAMP10
L0549	NCI CGAP HN10	carcinoma in situ from retromolar trigone				pAMP10
L0551	NCI CGAP HN7	normal squamous epithelium, floor of mouth				pAMP10
L0558	NCI CGAP Ov40	endometrioid ovarian metastasis	ovary			pAMP10
L0562	Chromosome 7 HeLa cDNA Library			HeLa cell line; ATCC		pAMP10
L0563	Human Bone Marrow Stromal Fibroblast	bone marrow				pBluescript
L0564	Jia bone marrow stroma	bone marrow stroma				pBluescript
L0565	Normal Human Trabecular Bone Cells	Bone	Hip			pBluescript
L0581	Stratagene liver (#937224)		liver			pBluescript SK
L0584	Stratagene cDNA library Human heart, cat#936208					pBluescript SK(+)
L0588	Stratagene endothelial cell 937223					pBluescript SK-
L0589	Stratagene fetal retina 937202					pBluescript SK-
L0590	Stratagene fibroblast (#937212)					pBluescript SK-
L0591	Stratagene HeLa cell s3 937216					pBluescript SK-
L0592	Stratagene hNT neuron (#937233)					pBluescript SK-
L0593	Stratagene neuroepithelium (#937231)					pBluescript SK-
L0594	Stratagene neuroepithelium NT2RAMI 937234					pBluescript SK-
L0595	Stratagene NT2 neuronal	neuroepithelial cells	brain			pBluescript

	precursor 937230					SK-
L0596	Stratagene colon (#937204)		colon			pBluescript SK-
L0597	Stratagene corneal stroma (#937222)		cornea			pBluescript SK-
L0598	Morton Fetal Cochlea	cochlea	ear			pBluescript SK-
L0599	Stratagene lung (#937210)		lung			pBluescript SK-
L0600	Weizmann Olfactory Epithelium	olfactory epithelium	nose			pBluescript SK-
L0601	Stratagene pancreas (#937208)		pancreas			pBluescript SK-
L0602	Pancreatic Islet	pancreatic islet	pancreas			pBluescript SK-
L0603	Stratagene placenta (#937225)		placenta			pBluescript SK-
L0604	Stratagene muscle 937209	muscle	skeletal muscle			pBluescript SK-
L0605	Stratagene fetal spleen (#937205)	fetal spleen	spleen			pBluescript SK-
L0606	NCI_CGAP_Lym5	follicular lymphoma	lymph node			pBluescript SK-
L0608	Stratagene lung carcinoma 937218	lung carcinoma	lung	NCI-H69		pBluescript SK-
L0615	22 week old human fetal liver cDNA library					pBluescriptII SK(-)
L0617	Chromosome 22 exon					pBluescriptII KS+
L0618	Chromosome 9 exon					pBluescriptII KS+
L0619	Chromosome 9 exon II					pBluescriptII KS+
L0622	HM1					pcDNAII (Invitrogen)
L0623	HM3	pectoral muscle (after mastectomy)				pcDNAII (Invitrogen)
L0629	NCI_CGAP_Mel3	metastatic melanoma to bowel	bowel (skin primary)			pCMV-SPORT4
L0630	NCI_CGAP_CNS1	substantia nigra	brain			pCMV-SPORT4
L0631	NCI_CGAP_Br7		breast			pCMV-SPORT4
L0635	NCI_CGAP_PNS1	dorsal root ganglion	peripheral nervous system			pCMV-SPORT4
L0636	NCI_CGAP_Pit1	four pooled pituitary adenomas	brain			pCMV-SPORT6
L0637	NCI_CGAP_Bm53	three pooled meningiomas	brain			pCMV-SPORT6
L0638	NCI_CGAP_Bm35	tumor, 5 pooled (see description)	brain			pCMV-SPORT6
L0639	NCI_CGAP_Bm52	tumor, 5 pooled (see description)	brain			pCMV-SPORT6
L0640	NCI_CGAP_Br18	four pooled high-grade tumors, including two prima	breast			pCMV-SPORT6
L0641	NCI_CGAP_Co17	juvenile granulosa tumor	colon			pCMV-SPORT6
L0642	NCI_CGAP_Co18	moderately differentiated adenocarcinoma	colon			pCMV-SPORT6
L0643	NCI_CGAP_Co19	moderately	colon			pCMV-

		differentiated adenocarcinoma				SPORT6
L0644	NCI_CGAP_Co20	moderately differentiated adenocarcinoma	colon			pCMV-SPORT6
L0645	NCI_CGAP_Co21	moderately differentiated adenocarcinoma	colon			pCMV-SPORT6
L0646	NCI_CGAP_Co14	moderately-differentiated adenocarcinoma	colon			pCMV-SPORT6
L0647	NCI_CGAP_Sar4	five pooled sarcomas, including myxoid liposarcoma	connective tissue			pCMV-SPORT6
L0648	NCI_CGAP_Eso2	squamous cell carcinoma	esophagus			pCMV-SPORT6
L0649	NCI_CGAP_GU1	2 pooled high-grade transitional cell tumors	genitourinary tract			pCMV-SPORT6
L0650	NCI_CGAP_Kid13	2 pooled Wilms' tumors, one primary and one metast	kidney			pCMV-SPORT6
L0651	NCI_CGAP_Kid8	renal cell tumor	kidney			pCMV-SPORT6
L0653	NCI_CGAP_Lu28	two pooled squamous cell carcinomas	lung			pCMV-SPORT6
L0654	NCI_CGAP_Lu31		lung, cell line			pCMV-SPORT6
L0655	NCI_CGAP_Lym12	lymphoma, follicular mixed small and large cell	lymph node			pCMV-SPORT6
L0656	NCI_CGAP_Ov38	normal epithelium	ovary			pCMV-SPORT6
L0657	NCI_CGAP_Ov23	tumor, 5 pooled (see description)	ovary			pCMV-SPORT6
L0658	NCI_CGAP_Ov35	tumor, 5 pooled (see description)	ovary			pCMV-SPORT6
L0659	NCI_CGAP_Pan1	adenocarcinoma	pancreas			pCMV-SPORT6
L0661	NCI_CGAP_Mel15	malignant melanoma, metastatic to lymph node	skin			pCMV-SPORT6
L0662	NCI_CGAP_Gas4	poorly differentiated adenocarcinoma with signet r	stomach			pCMV-SPORT6
L0663	NCI_CGAP_Ut2	moderately-differentiated endometrial adenocarcino	uterus			pCMV-SPORT6
L0664	NCI_CGAP_Ut3	poorly-differentiated endometrial adenocarcinoma,	uterus			pCMV-SPORT6
L0665	NCI_CGAP_Ut4	serous papillary carcinoma, high grade, 2 pooled t	uterus			pCMV-SPORT6
L0666	NCI_CGAP_Ut1	well-differentiated endometrial adenocarcinoma, 7	uterus			pCMV-SPORT6
L0667	NCI_CGAP_CML1	myeloid cells, 18 pooled CML cases, BCR/ABL rearra	whole blood			pCMV-SPORT6

L0697	Testis 1					PGEM 5zf(+)
L0717	Gessler Wilms tumor					pSPORT1
L0731	Soares_pregnant_uterus_NbHPU		uterus			pT7T3-Pac
L0738	Human colorectal cancer					pT7T3D
L0740	Soares melanocyte 2NbHM	melanocyte				pT7T3D (Pharmacia) with a modified polylinker
L0741	Soares adult brain N2b4HB55Y		brain			pT7T3D (Pharmacia) with a modified polylinker
L0742	Soares adult brain N2b5HB55Y		brain			pT7T3D (Pharmacia) with a modified polylinker
L0743	Soares breast 2NbHBst		breast			pT7T3D (Pharmacia) with a modified polylinker
L0744	Soares breast 3NbHBst		breast			pT7T3D (Pharmacia) with a modified polylinker
L0745	Soares retina N2b4HR	retina	eye			pT7T3D (Pharmacia) with a modified polylinker
L0746	Soares retina N2b5HR	retina	eye			pT7T3D (Pharmacia) with a modified polylinker
L0747	Soares_fetal_heart_NbHH 19W		heart			pT7T3D (Pharmacia) with a modified polylinker
L0748	Soares fetal liver spleen 1NFLS		Liver and Spleen			pT7T3D (Pharmacia) with a modified polylinker
L0749	Soares_fetal_liver_spleen_INFLS_S1		Liver and Spleen			pT7T3D (Pharmacia) with a modified polylinker
L0750	Soares_fetal_lung_NbHL1 9W		lung			pT7T3D (Pharmacia) with a modified polylinker
L0751	Soares ovary tumor NbHOT	ovarian tumor	ovary			pT7T3D (Pharmacia) with a

						modified polylinker
L0752	Soares_parathyroid_tumor_NbHPA	parathyroid tumor	parathyroid gland			pT7T3D (Pharmacia) with a modified polylinker
L0753	Soares_pineal_gland_N3H PG		pineal gland			pT7T3D (Pharmacia) with a modified polylinker
L0754	Soares_placenta Nb2HP		placenta			pT7T3D (Pharmacia) with a modified polylinker
L0755	Soares_placenta_8to9weeks_2NbHP8to9W		placenta			pT7T3D (Pharmacia) with a modified polylinker
L0756	Soares_multiple_sclerosis_2NbHMSP	multiple sclerosis lesions				pT7T3D (Pharmacia) with a modified polylinker V TYPE
L0757	Soares_senescent_fibroblasts_NbHSF	senescent fibroblast				pT7T3D (Pharmacia) with a modified polylinker V TYPE
L0758	Soares_testis_NHT					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0759	Soares_total_fetus_Nb2HF8_9w					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0761	NCI_CGAP_CLL1	B-cell, chronic lymphocytic leukemia				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0762	NCI_CGAP_Br1.1	breast				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0763	NCI_CGAP_Br2	breast				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0764	NCI_CGAP_Co3	colon				pT7T3D-Pac (Pharmacia) with a modified polylinker

L0766	NCI_CGAP_GCB1	germinal center B cell				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0767	NCI_CGAP_GC3	pooled germ cell tumors				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0768	NCI_CGAP_GC4	pooled germ cell tumors				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0769	NCI_CGAP_Brn25	anaplastic oligodendroglioma	brain			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0770	NCI_CGAP_Brn23	glioblastoma (pooled)	brain			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0771	NCI_CGAP_Co8	adenocarcinoma	colon			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0772	NCI_CGAP_Co10	colon tumor RER+	colon			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0773	NCI_CGAP_Co9	colon tumor RER+	colon			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0774	NCI_CGAP_Kid3		kidney			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0775	NCI_CGAP_Kid5	2 pooled tumors (clear cell type)	kidney			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0776	NCI_CGAP_Lu5	carcinoid	lung			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0777	Soares_NhHMPu_S1	Pooled human melanocyte, fetal heart, and pregnant	mixed (see below)			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0778	Barstead pancreas HPLRB1		pancreas			pT7T3D-Pac (Pharmacia) with a modified

						polylinker
L0779	Soares_NFL_T_GBC_S1		pooled			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0780	Soares_NSF_F8_9W_OT _PA_P_S1		pooled			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0782	NCI_CGAP_Pr21	normal prostate	prostate			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0783	NCI_CGAP_Pr22	normal prostate	prostate			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0785	Barstead spleen HPLRB2		spleen			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0786	Soares_NbHFB		whole brain			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0787	NCI_CGAP_Sub1					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0788	NCI_CGAP_Sub2					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0789	NCI_CGAP_Sub3					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0790	NCI_CGAP_Sub4					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0791	NCI_CGAP_Sub5					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0792	NCI_CGAP_Sub6					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0793	NCI_CGAP_Sub7					pT7T3D-Pac (Pharmacia) with a



						modified polylinker
L0794	NCI_CGAP_GC6	pooled germ cell tumors				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0796	NCI_CGAP_Brn50	medulloblastoma	brain			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0800	NCI_CGAP_Co16	colon tumor, RER+	colon			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0803	NCI_CGAP_Kid11		kidney			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0804	NCI_CGAP_Kid12	2 pooled tumors (clear cell type)	kidney			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0805	NCI_CGAP_Lu24	carcinoid	lung			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0806	NCI_CGAP_Lu19	squamous cell carcinoma, poorly differentiated (4	lung			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0807	NCI_CGAP_Ov18	fibrotheoma	ovary			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0808	Barstead prostate BPH HPLRB4 1		prostate			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0809	NCI_CGAP_Pr28		prostate			pT7T3D-Pac (Pharmacia) with a modified polylinker
L2251	Human fetal lung	Fetal lung				

**TABLE 5**

OMIM Reference	Description
104770	Amyloidosis, secondary, susceptibility to
106165	Hypertension, essential, 145500
107670	Apolipoprotein A-II deficiency
108730	Brody myopathy, 601003
109400	Basal cell nevus syndrome
110700	Vivax malaria, susceptibility to
117700	[Hypoceruloplasminemia, hereditary]
117700	Hemosiderosis, systemic, due to aceruloplasminemia
125264	Leukemia, acute nonlymphocytic
126650	Chloride diarrhea, congenital, Finnish type, 214700
126650	Colon cancer
132800	Basal cell carcinoma
132800	Epithelioma, self-healing, squamous 1, Ferguson-Smith type
134570	Factor XIIIa deficiency
135940	Ichthyosis vulgaris, 146700
145001	Hyperparathyroidism-jaw tumor syndrome
146790	Lupus nephritis, susceptibility to
147781	Atopy, susceptibility to
150210	Lactoferrin-deficient neutrophils, 245480
150240	Cutis laxa, marfanoid neonatal type
152445	Vohwinkel syndrome, 124500
152445	Erythrokeratoderma, progressive symmetric, 602036
154276	Malignant hyperthermia susceptibility 3
159001	Muscular dystrophy, limb-girdle, type 1B
169600	Hailey-Hailey disease
172471	Glycogenosis, hepatic, autosomal
173360	Thrombophilia due to excessive plasminogen activator inhibitor
173360	Hemorrhagic diathesis due to PAI1 deficiency
174000	Medullary cystic kidney disease, AD
179755	Renal cell carcinoma, papillary, 1
180105	Retinitis pigmentosa-10
180380	Night blindness, congenital stationary, rhodopsin-related
180380	Retinitis pigmentosa, autosomal recessive
180380	Retinitis pigmentosa-4, autosomal dominant
182860	Pyropoikilocytosis
182860	Spherocytosis, recessive
182860	Elliptocytosis-2
186580	Arthrocutaneous uveal granulomatosis
186855	Leukemia-2, T-cell acute lymphoblastic
190000	Atransferrinemia
191315	Insensitivity to pain, congenital, with anhidrosis, 256800

203500	Alkaptonuria
222800	Hemolytic anemia due to bisphosphoglycerate mutase deficiency
222900	Sucrose intolerance
223900	Dysautonomia, familial
230800	Gaucher disease
230800	Gaucher disease with cardiovascular calcification
232050	Propionicacidemia, type II or pccB type
246900	Lipoamide dehydrogenase deficiency
253800	Walker-Warburg syndrome, 236670
253800	Fukuyama type congenital muscular dystrophy
264800	Pseudoxanthoma elasticum
266200	Anemia, hemolytic, due to PK deficiency
266600	Inflammatory bowel disease-1
276902	Usher syndrome, type 3
278700	Xeroderma pigmentosum, group A
278760	Xeroderma pigmentosum, group F
600511	Schizophrenia-3
600760	Pseudohypoaldosteronism, type I, 264350
600760	Liddle syndrome, 177200
600761	Pseudohypoaldosteronism, type I, 264350
600761	Liddle syndrome, 177200
600882	Charcot-Marie-Tooth neuropathy-2B
600897	Cataract, zonular pulverulent-1, 116200
601105	Pycnodysostosis, 265800
601199	Neonatal hyperparathyroidism, 239200
601199	Hypocalcemia, autosomal dominant, 601198
601199	Hypocalciuric hypercalcemia, type I, 145980
601412	Deafness, autosomal dominant 7
601471	Moebius syndrome-2
601556	Spinocerebellar ataxia-1, 164400
601652	Glaucoma 1A, primary open angle, juvenile-onset, 137750
601682	Glaucoma 1C, primary open angle
602066	Convulsions, infantile and paroxysmal choreoathetosis
602088	Nephronophthisis, infantile
602136	Refsum disease, infantile, 266510
602136	Zellweger syndrome-1, 214100
602136	Adrenoleukodystrophy, neonatal, 202370
602447	Coronary artery disease, susceptibility to
602491	Hyperlipidemia, familial combined, 1

### *Polynucleotide and Polypeptide Variants*

[84] The present invention is directed to variants of the polynucleotide sequence disclosed in SEQ ID NO:X or the complementary strand thereto, nucleotide sequences encoding the polypeptide of SEQ ID NO:Y, the nucleotide sequence of SEQ ID NO:X encoding the polypeptide sequence as defined in column 7 of Table 1A, nucleotide sequences encoding the polypeptide as defined in column 7 of Table 1A, the nucleotide sequence as defined in columns 8 and 9 of Table 2, nucleotide sequences encoding the polypeptide encoded by the nucleotide sequence as defined in columns 8 and 9 of Table 2, the nucleotide sequence as defined in column 6 of Table 1B, nucleotide sequences encoding the polypeptide encoded by the nucleotide sequence as defined in column 6 of Table 1B, the cDNA sequence contained in Clone ID NO:Z, and/or nucleotide sequences encoding the polypeptide encoded by the cDNA sequence contained in Clone ID NO:Z.

[85] The present invention also encompasses variants of the polypeptide sequence disclosed in SEQ ID NO:Y, the polypeptide sequence as defined in column 7 of Table 1A, a polypeptide sequence encoded by the polynucleotide sequence in SEQ ID NO:X, a polypeptide sequence encoded by the nucleotide sequence as defined in columns 8 and 9 of Table 2, a polypeptide sequence encoded by the nucleotide sequence as defined in column 6 of Table 1B, a polypeptide sequence encoded by the complement of the polynucleotide sequence in SEQ ID NO:X, and/or a polypeptide sequence encoded by the cDNA sequence contained in Clone ID NO:Z.

[86] "Variant" refers to a polynucleotide or polypeptide differing from the polynucleotide or polypeptide of the present invention, but retaining essential properties thereof. Generally, variants are overall closely similar, and, in many regions, identical to the polynucleotide or polypeptide of the present invention.

[87] Thus, one aspect of the invention provides an isolated nucleic acid molecule comprising, or alternatively consisting of, a polynucleotide having a nucleotide sequence selected from the group consisting of: (a) a nucleotide sequence described in SEQ ID NO:X or contained in the cDNA sequence of Clone ID NO:Z; (b) a nucleotide sequence in SEQ ID NO:X or the cDNA in Clone ID NO:Z which encodes the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; (c) a nucleotide sequence in SEQ ID NO:X or the cDNA in Clone ID NO:Z which encodes a mature polypeptide; (d) a nucleotide sequence in SEQ ID NO:X or the cDNA sequence of Clone ID NO:Z, which encodes a biologically active fragment of a polypeptide;

(e) a nucleotide sequence in SEQ ID NO:X or the cDNA sequence of Clone ID NO:Z, which encodes an antigenic fragment of a polypeptide; (f) a nucleotide sequence encoding a polypeptide comprising the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; (g) a nucleotide sequence encoding a mature polypeptide of the amino acid sequence of SEQ ID NO:Y or the amino acid sequence encoded by the cDNA in Clone ID NO:Z; (h) a nucleotide sequence encoding a biologically active fragment of a polypeptide having the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; (i) a nucleotide sequence encoding an antigenic fragment of a polypeptide having the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; and (j) a nucleotide sequence complementary to any of the nucleotide sequences in (a), (b), (c), (d), (e), (f), (g), (h), or (i) above.

**[88]** The present invention is also directed to nucleic acid molecules which comprise, or alternatively consist of, a nucleotide sequence which is at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100%, identical to, for example, any of the nucleotide sequences in (a), (b), (c), (d), (e), (f), (g), (h), (i), or (j) above, the nucleotide coding sequence in SEQ ID NO:X or the complementary strand thereto, the nucleotide coding sequence of the cDNA contained in Clone ID NO:Z or the complementary strand thereto, a nucleotide sequence encoding the polypeptide of SEQ ID NO:Y, a nucleotide sequence encoding a polypeptide sequence encoded by the nucleotide sequence in SEQ ID NO:X, a polypeptide sequence encoded by the complement of the polynucleotide sequence in SEQ ID NO:X, a nucleotide sequence encoding the polypeptide encoded by the cDNA contained in Clone ID NO:Z, the nucleotide coding sequence in SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or the complementary strand thereto, a nucleotide sequence encoding the polypeptide encoded by the nucleotide sequence in SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or the complementary strand thereto, the nucleotide coding sequence in SEQ ID NO:B as defined in column 6 of Table 1B or the complementary strand thereto, a nucleotide sequence encoding the polypeptide encoded by the nucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B or the complementary strand thereto, the nucleotide sequence in SEQ ID NO:X encoding the polypeptide sequence as defined in column 7 of Table 1A or the complementary strand thereto, nucleotide sequences encoding the polypeptide as defined in column 7 of Table 1A or the complementary strand thereto,

and/or polynucleotide fragments of any of these nucleic acid molecules (e.g., those fragments described herein). Polynucleotides which hybridize to the complement of these nucleic acid molecules under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention, as are polypeptides encoded by these polynucleotides and nucleic acids.

[89] In a preferred embodiment, the invention encompasses nucleic acid molecules which comprise, or alternatively, consist of a polynucleotide which hybridizes under stringent hybridization conditions, or alternatively, under lower stringency conditions, to a polynucleotide in (a), (b), (c), (d), (e), (f), (g), (h), or (i), above, as are polypeptides encoded by these polynucleotides. In another preferred embodiment, polynucleotides which hybridize to the complement of these nucleic acid molecules under stringent hybridization conditions, or alternatively, under lower stringency conditions, are also encompassed by the invention, as are polypeptides encoded by these polynucleotides.

[90] In another embodiment, the invention provides a purified protein comprising, or alternatively consisting of, a polypeptide having an amino acid sequence selected from the group consisting of: (a) the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; (b) the amino acid sequence of a mature form of a polypeptide having the amino acid sequence of SEQ ID NO:Y or the amino acid sequence encoded by the cDNA in Clone ID NO:Z; (c) the amino acid sequence of a biologically active fragment of a polypeptide having the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; and (d) the amino acid sequence of an antigenic fragment of a polypeptide having the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z.

[91] The present invention is also directed to proteins which comprise, or alternatively consist of, an amino acid sequence which is at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100%, identical to, for example, any of the amino acid sequences in (a), (b), (c), or (d), above, the amino acid sequence shown in SEQ ID NO:Y, the amino acid sequence encoded by the cDNA contained in Clone ID NO:Z, the amino acid sequence of the polypeptide encoded by the nucleotide sequence in SEQ ID NO:X as defined in columns 8 and 9 of Table 2, the amino acid sequence of the polypeptide encoded by the nucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B, the amino acid sequence as defined in column 7 of Table 1A, an amino acid sequence encoded by the nucleotide

sequence in SEQ ID NO:X, and an amino acid sequence encoded by the complement of the polynucleotide sequence in SEQ ID NO:X. Fragments of these polypeptides are also provided (e.g., those fragments described herein). Further proteins encoded by polynucleotides which hybridize to the complement of the nucleic acid molecules encoding these amino acid sequences under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention, as are the polynucleotides encoding these proteins.

[92] By a nucleic acid having a nucleotide sequence at least, for example, 95% "identical" to a reference nucleotide sequence of the present invention, it is intended that the nucleotide sequence of the nucleic acid is identical to the reference sequence except that the nucleotide sequence may include up to five point mutations per each 100 nucleotides of the reference nucleotide sequence encoding the polypeptide. In other words, to obtain a nucleic acid having a nucleotide sequence at least 95% identical to a reference nucleotide sequence, up to 5% of the nucleotides in the reference sequence may be deleted or substituted with another nucleotide, or a number of nucleotides up to 5% of the total nucleotides in the reference sequence may be inserted into the reference sequence. The query sequence may be an entire sequence referred to in Table 1A or 2 as the ORF (open reading frame), or any fragment specified as described herein.

[93] As a practical matter, whether any particular nucleic acid molecule or polypeptide is at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to a nucleotide sequence of the present invention can be determined conventionally using known computer programs. A preferred method for determining the best overall match between a query sequence (a sequence of the present invention) and a subject sequence, also referred to as a global sequence alignment, can be determined using the FASTDB computer program based on the algorithm of Brutlag et al. (Comp. App. Biosci. 6:237-245 (1990)). In a sequence alignment the query and subject sequences are both DNA sequences. An RNA sequence can be compared by converting U's to T's. The result of said global sequence alignment is expressed as percent identity. Preferred parameters used in a FASTDB alignment of DNA sequences to calculate percent identity are: Matrix=Unitary, k-tuple=4, Mismatch Penalty=1, Joining Penalty=30, Randomization Group Length=0, Cutoff Score=1, Gap Penalty=5, Gap Size Penalty 0.05, Window Size=500 or the length of the subject nucleotide sequence, whichever is shorter.

[94] If the subject sequence is shorter than the query sequence because of 5' or 3'

deletions, not because of internal deletions, a manual correction must be made to the results. This is because the FASTDB program does not account for 5' and 3' truncations of the subject sequence when calculating percent identity. For subject sequences truncated at the 5' or 3' ends, relative to the query sequence, the percent identity is corrected by calculating the number of bases of the query sequence that are 5' and 3' of the subject sequence, which are not matched/aligned, as a percent of the total bases of the query sequence. Whether a nucleotide is matched/aligned is determined by results of the FASTDB sequence alignment. This percentage is then subtracted from the percent identity, calculated by the above FASTDB program using the specified parameters, to arrive at a final percent identity score. This corrected score is what is used for the purposes of the present invention. Only bases outside the 5' and 3' bases of the subject sequence, as displayed by the FASTDB alignment, which are not matched/aligned with the query sequence, are calculated for the purposes of manually adjusting the percent identity score.

[95] For example, a 90 base subject sequence is aligned to a 100 base query sequence to determine percent identity. The deletions occur at the 5' end of the subject sequence and therefore, the FASTDB alignment does not show a matched/alignment of the first 10 bases at 5' end. The 10 unpaired bases represent 10% of the sequence (number of bases at the 5' and 3' ends not matched/total number of bases in the query sequence) so 10% is subtracted from the percent identity score calculated by the FASTDB program. If the remaining 90 bases were perfectly matched the final percent identity would be 90%. In another example, a 90 base subject sequence is compared with a 100 base query sequence. This time the deletions are internal deletions so that there are no bases on the 5' or 3' of the subject sequence which are not matched/aligned with the query. In this case the percent identity calculated by FASTDB is not manually corrected. Once again, only bases 5' and 3' of the subject sequence which are not matched/aligned with the query sequence are manually corrected for. No other manual corrections are to be made for the purposes of the present invention.

[96] By a polypeptide having an amino acid sequence at least, for example, 95% "identical" to a query amino acid sequence of the present invention, it is intended that the amino acid sequence of the subject polypeptide is identical to the query sequence except that the subject polypeptide sequence may include up to five amino acid alterations per each 100 amino acids of the query amino acid sequence. In other words, to obtain a polypeptide having an amino acid sequence at least 95% identical to a query amino acid sequence, up to



5% of the amino acid residues in the subject sequence may be inserted, deleted, (indels) or substituted with another amino acid. These alterations of the reference sequence may occur at the amino or carboxy terminal positions of the reference amino acid sequence or anywhere between those terminal positions, interspersed either individually among residues in the reference sequence or in one or more contiguous groups within the reference sequence.

[97] As a practical matter, whether any particular polypeptide is at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to, for instance, the amino acid sequence of a polypeptide referred to in Table 1A (e.g., the amino acid sequence identified in column 6) or Table 2 (e.g., the amino acid sequence of the polypeptide encoded by the polynucleotide sequence defined in columns 8 and 9 of Table 2) or a fragment thereof, the amino acid sequence of the polypeptide encoded by the polynucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B or a fragment thereof, the amino acid sequence of the polypeptide encoded by the nucleotide sequence in SEQ ID NO:X or a fragment thereof, or the amino acid sequence of the polypeptide encoded by cDNA contained in Clone ID NO:Z, or a fragment thereof, can be determined conventionally using known computer programs. A preferred method for determining the best overall match between a query sequence (a sequence of the present invention) and a subject sequence, also referred to as a global sequence alignment, can be determined using the FASTDB computer program based on the algorithm of Brutlag et al. (Comp. App. Biosci.6:237-245 (1990)). In a sequence alignment the query and subject sequences are either both nucleotide sequences or both amino acid sequences. The result of said global sequence alignment is expressed as percent identity. Preferred parameters used in a FASTDB amino acid alignment are: Matrix=PAM 0, k-tuple=2, Mismatch Penalty=1, Joining Penalty=20, Randomization Group Length=0, Cutoff Score=1, Window Size=sequence length, Gap Penalty=5, Gap Size Penalty=0.05, Window Size=500 or the length of the subject amino acid sequence, whichever is shorter.

[98] If the subject sequence is shorter than the query sequence due to N- or C-terminal deletions, not because of internal deletions, a manual correction must be made to the results. This is because the FASTDB program does not account for N- and C-terminal truncations of the subject sequence when calculating global percent identity. For subject sequences truncated at the N- and C-termini, relative to the query sequence, the percent identity is corrected by calculating the number of residues of the query sequence that are N- and C-terminal of the subject sequence, which are not matched/aligned with a corresponding

subject residue, as a percent of the total bases of the query sequence. Whether a residue is matched/aligned is determined by results of the FASTDB sequence alignment. This percentage is then subtracted from the percent identity, calculated by the above FASTDB program using the specified parameters, to arrive at a final percent identity score. This final percent identity score is what is used for the purposes of the present invention. Only residues to the N- and C-termini of the subject sequence, which are not matched/aligned with the query sequence, are considered for the purposes of manually adjusting the percent identity score. That is, only query residue positions outside the farthest N- and C- terminal residues of the subject sequence.

[99] For example, a 90 amino acid residue subject sequence is aligned with a 100 residue query sequence to determine percent identity. The deletion occurs at the N-terminus of the subject sequence and therefore, the FASTDB alignment does not show a matching/alignment of the first 10 residues at the N-terminus. The 10 unpaired residues represent 10% of the sequence (number of residues at the N- and C- termini not matched/total number of residues in the query sequence) so 10% is subtracted from the percent identity score calculated by the FASTDB program. If the remaining 90 residues were perfectly matched the final percent identity would be 90%. In another example, a 90 residue subject sequence is compared with a 100 residue query sequence. This time the deletions are internal deletions so there are no residues at the N- or C-termini of the subject sequence which are not matched/aligned with the query. In this case the percent identity calculated by FASTDB is not manually corrected. Once again, only residue positions outside the N- and C-terminal ends of the subject sequence, as displayed in the FASTDB alignment, which are not matched/aligned with the query sequence are manually corrected for. No other manual corrections are to made for the purposes of the present invention.

[100] The polynucleotide variants of the invention may contain alterations in the coding regions, non-coding regions, or both. Especially preferred are polynucleotide variants containing alterations which produce silent substitutions, additions, or deletions, but do not alter the properties or activities of the encoded polypeptide. Nucleotide variants produced by silent substitutions due to the degeneracy of the genetic code are preferred. Moreover, polypeptide variants in which less than 50, less than 40, less than 30, less than 20, less than 10, or 5-50, 5-25, 5-10, 1-5, or 1-2 amino acids are substituted, deleted, or added in any combination are also preferred. Polynucleotide variants can be produced for a

variety of reasons, e.g., to optimize codon expression for a particular host (change codons in the human mRNA to those preferred by a bacterial host such as *E. coli*).

[101] Naturally occurring variants are called "allelic variants," and refer to one of several alternate forms of a gene occupying a given locus on a chromosome of an organism. (Genes II, Lewin, B., ed., John Wiley & Sons, New York (1985)). These allelic variants can vary at either the polynucleotide and/or polypeptide level and are included in the present invention. Alternatively, non-naturally occurring variants may be produced by mutagenesis techniques or by direct synthesis.

[102] Using known methods of protein engineering and recombinant DNA technology, variants may be generated to improve or alter the characteristics of the polypeptides of the present invention. For instance, one or more amino acids can be deleted from the N-terminus or C-terminus of the polypeptide of the present invention without substantial loss of biological function. As an example, Ron et al. (*J. Biol. Chem.* 268: 2984-2988 (1993)) reported variant KGF proteins having heparin binding activity even after deleting 3, 8, or 27 amino-terminal amino acid residues. Similarly, Interferon gamma exhibited up to ten times higher activity after deleting 8-10 amino acid residues from the carboxy terminus of this protein. (Dobeli et al., *J. Biotechnology* 7:199-216 (1988).)

[103] Moreover, ample evidence demonstrates that variants often retain a biological activity similar to that of the naturally occurring protein. For example, Gayle and coworkers (*J. Biol. Chem.* 268:22105-22111 (1993)) conducted extensive mutational analysis of human cytokine IL-1a. They used random mutagenesis to generate over 3,500 individual IL-1a mutants that averaged 2.5 amino acid changes per variant over the entire length of the molecule. Multiple mutations were examined at every possible amino acid position. The investigators found that "[m]ost of the molecule could be altered with little effect on either [binding or biological activity]." In fact, only 23 unique amino acid sequences, out of more than 3,500 nucleotide sequences examined, produced a protein that significantly differed in activity from wild-type.

[104] Furthermore, even if deleting one or more amino acids from the N-terminus or C-terminus of a polypeptide results in modification or loss of one or more biological functions, other biological activities may still be retained. For example, the ability of a deletion variant to induce and/or to bind antibodies which recognize the secreted form will likely be retained when less than the majority of the residues of the secreted form are removed from the N-terminus or C-terminus. Whether a particular polypeptide lacking N-

or C-terminal residues of a protein retains such immunogenic activities can readily be determined by routine methods described herein and otherwise known in the art.

[105] Thus, the invention further includes polypeptide variants which show a functional activity (e.g., biological activity) of the polypeptides of the invention. Such variants include deletions, insertions, inversions, repeats, and substitutions selected according to general rules known in the art so as have little effect on activity.

[106] The present application is directed to nucleic acid molecules at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100% identical to the nucleic acid sequences disclosed herein, (e.g., encoding a polypeptide having the amino acid sequence of an N and/or C terminal deletion), irrespective of whether they encode a polypeptide having functional activity. This is because even where a particular nucleic acid molecule does not encode a polypeptide having functional activity, one of skill in the art would still know how to use the nucleic acid molecule, for instance, as a hybridization probe or a polymerase chain reaction (PCR) primer. Uses of the nucleic acid molecules of the present invention that do not encode a polypeptide having functional activity include, inter alia, (1) isolating a gene or allelic or splice variants thereof in a cDNA library; (2) in situ hybridization (e.g., "FISH") to metaphase chromosomal spreads to provide precise chromosomal location of the gene, as described in Verma et al., Human Chromosomes: A Manual of Basic Techniques, Pergamon Press, New York (1988); (3) Northern Blot analysis for detecting mRNA expression in specific tissues (e.g., normal or diseased tissues); and (4) *in situ* hybridization (e.g., histochemistry) for detecting mRNA expression in specific tissues (e.g., normal or diseased tissues).

[107] Preferred, however, are nucleic acid molecules having sequences at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100% identical to the nucleic acid sequences disclosed herein, which do, in fact, encode a polypeptide having functional activity. By a polypeptide having "functional activity" is meant, a polypeptide capable of displaying one or more known functional activities associated with a full-length (complete) protein of the invention. Such functional activities include, but are not limited to, biological activity, antigenicity [ability to bind (or compete with a polypeptide of the invention for binding) to an anti-polypeptide of the invention antibody], immunogenicity (ability to generate antibody which binds to a specific polypeptide of the invention), ability to form multimers with polypeptides of the invention, and ability to bind to a receptor or ligand for a polypeptide of the invention.

[108] The functional activity of the polypeptides, and fragments, variants and derivatives of the invention, can be assayed by various methods.

[109] For example, in one embodiment where one is assaying for the ability to bind or compete with a full-length polypeptide of the present invention for binding to an anti-polypeptide antibody, various immunoassays known in the art can be used, including but not limited to, competitive and non-competitive assay systems using techniques such as radioimmunoassays, ELISA (enzyme linked immunosorbent assay), "sandwich" immunoassays, immunoradiometric assays, gel diffusion precipitation reactions, immunodiffusion assays, in situ immunoassays (using colloidal gold, enzyme or radioisotope labels, for example), western blots, precipitation reactions, agglutination assays (e.g., gel agglutination assays, hemagglutination assays), complement fixation assays, immunofluorescence assays, protein A assays, and immunoelectrophoresis assays, etc. In one embodiment, antibody binding is detected by detecting a label on the primary antibody. In another embodiment, the primary antibody is detected by detecting binding of a secondary antibody or reagent to the primary antibody. In a further embodiment, the secondary antibody is labeled. Many means are known in the art for detecting binding in an immunoassay and are within the scope of the present invention.

[110] In another embodiment, where a ligand is identified, or the ability of a polypeptide fragment, variant or derivative of the invention to multimerize is being evaluated, binding can be assayed, e.g., by means well-known in the art, such as, for example, reducing and non-reducing gel chromatography, protein affinity chromatography, and affinity blotting. See generally, Phizicky et al., Microbiol. Rev. 59:94-123 (1995). In another embodiment, the ability of physiological correlates of a polypeptide of the present invention to bind to a substrate(s) of the polypeptide of the invention can be routinely assayed using techniques known in the art.

[111] In addition, assays described herein (see Examples) and otherwise known in the art may routinely be applied to measure the ability of polypeptides of the present invention and fragments, variants and derivatives thereof to elicit polypeptide related biological activity (either *in vitro* or *in vivo*). Other methods will be known to the skilled artisan and are within the scope of the invention.

[112] Of course, due to the degeneracy of the genetic code, one of ordinary skill in the art will immediately recognize that a large number of the nucleic acid molecules having a sequence at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99%, or 100% identical to, for

example, the nucleic acid sequence of the cDNA contained in Clone ID NO:Z, the nucleic acid sequence referred to in Table 1A (SEQ ID NO:X), the nucleic acid sequence disclosed in Table 2 (e.g., the nucleic acid sequence delineated in columns 8 and 9) or fragments thereof, will encode polypeptides "having functional activity." In fact, since degenerate variants of any of these nucleotide sequences all encode the same polypeptide, in many instances, this will be clear to the skilled artisan even without performing the above described comparison assay. It will be further recognized in the art that, for such nucleic acid molecules that are not degenerate variants, a reasonable number will also encode a polypeptide having functional activity. This is because the skilled artisan is fully aware of amino acid substitutions that are either less likely or not likely to significantly effect protein function (e.g., replacing one aliphatic amino acid with a second aliphatic amino acid), as further described below.

[113] For example, guidance concerning how to make phenotypically silent amino acid substitutions is provided in Bowie et al., "Deciphering the Message in Protein Sequences: Tolerance to Amino Acid Substitutions," *Science* 247:1306-1310 (1990), wherein the authors indicate that there are two main strategies for studying the tolerance of an amino acid sequence to change.

[114] The first strategy exploits the tolerance of amino acid substitutions by natural selection during the process of evolution. By comparing amino acid sequences in different species, conserved amino acids can be identified. These conserved amino acids are likely important for protein function. In contrast, the amino acid positions where substitutions have been tolerated by natural selection indicates that these positions are not critical for protein function. Thus, positions tolerating amino acid substitution could be modified while still maintaining biological activity of the protein.

[115] The second strategy uses genetic engineering to introduce amino acid changes at specific positions of a cloned gene to identify regions critical for protein function. For example, site directed mutagenesis or alanine-scanning mutagenesis (introduction of single alanine mutations at every residue in the molecule) can be used. See Cunningham and Wells, *Science* 244:1081-1085 (1989). The resulting mutant molecules can then be tested for biological activity.

[116] As the authors state, these two strategies have revealed that proteins are surprisingly tolerant of amino acid substitutions. The authors further indicate which amino acid changes are likely to be permissive at certain amino acid positions in the protein. For

example, most buried (within the tertiary structure of the protein) amino acid residues require nonpolar side chains, whereas few features of surface side chains are generally conserved. Moreover, tolerated conservative amino acid substitutions involve replacement of the aliphatic or hydrophobic amino acids Ala, Val, Leu and Ile; replacement of the hydroxyl residues Ser and Thr; replacement of the acidic residues Asp and Glu; replacement of the amide residues Asn and Gln, replacement of the basic residues Lys, Arg, and His; replacement of the aromatic residues Phe, Tyr, and Trp, and replacement of the small-sized amino acids Ala, Ser, Thr, Met, and Gly. Besides conservative amino acid substitution, variants of the present invention include (i) substitutions with one or more of the non-conserved amino acid residues, where the substituted amino acid residues may or may not be one encoded by the genetic code, or (ii) substitutions with one or more of the amino acid residues having a substituent group, or (iii) fusion of the mature polypeptide with another compound, such as a compound to increase the stability and/or solubility of the polypeptide (for example, polyethylene glycol), (iv) fusion of the polypeptide with additional amino acids, such as, for example, an IgG Fc fusion region peptide, serum albumin (preferably human serum albumin) or a fragment thereof, or leader or secretory sequence, or a sequence facilitating purification, or (v) fusion of the polypeptide with another compound, such as albumin (including but not limited to recombinant albumin (see, e.g., U.S. Patent No. 5,876,969, issued March 2, 1999, EP Patent 0 413 622, and U.S. Patent No. 5,766,883, issued June 16, 1998, herein incorporated by reference in their entirety)). Such variant polypeptides are deemed to be within the scope of those skilled in the art from the teachings herein.

[117] For example, polypeptide variants containing amino acid substitutions of charged amino acids with other charged or neutral amino acids may produce proteins with improved characteristics, such as less aggregation. Aggregation of pharmaceutical formulations both reduces activity and increases clearance due to the aggregate's immunogenic activity. See Pinckard et al., Clin. Exp. Immunol. 2:331-340 (1967); Robbins et al., Diabetes 36: 838-845 (1987); Cleland et al., Crit. Rev. Therapeutic Drug Carrier Systems 10:307-377 (1993).

[118] A further embodiment of the invention relates to polypeptides which comprise the amino acid sequence of a polypeptide having an amino acid sequence which contains at least one amino acid substitution, but not more than 50 amino acid substitutions, even more preferably, not more than 40 amino acid substitutions, still more preferably, not more than 30 amino acid substitutions, and still even more preferably, not more than 20 amino acid

substitutions from a polypeptide sequence disclosed herein. Of course it is highly preferable for a polypeptide to have an amino acid sequence which comprises the amino acid sequence of a polypeptide of SEQ ID NO:Y, an amino acid sequence encoded by SEQ ID NO:X, an amino acid sequence encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, an amino acid sequence encoded by the complement of SEQ ID NO:X, and/or an amino acid sequence encoded by cDNA contained in Clone ID NO:Z which contains, in order of ever-increasing preference, at least one, but not more than 10, 9, 8, 7, 6, 5, 4, 3, 2 or 1 amino acid substitutions.

[119] In specific embodiments, the polypeptides of the invention comprise, or alternatively, consist of, fragments or variants of a reference amino acid sequence selected from: (a) the amino acid sequence of SEQ ID NO:Y or fragments thereof (e.g., the mature form and/or other fragments described herein); (b) the amino acid sequence encoded by SEQ ID NO:X or fragments thereof; (c) the amino acid sequence encoded by the complement of SEQ ID NO:X or fragments thereof; (d) the amino acid sequence encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or fragments thereof; and (e) the amino acid sequence encoded by cDNA contained in Clone ID NO:Z or fragments thereof; wherein the fragments or variants have 1-5, 5-10, 5-25, 5-50, 10-50 or 50-150, amino acid residue additions, substitutions, and/or deletions when compared to the reference amino acid sequence. In preferred embodiments, the amino acid substitutions are conservative. Polynucleotides encoding these polypeptides are also encompassed by the invention.

#### *Polynucleotide and Polypeptide Fragments*

[120] The present invention is also directed to polynucleotide fragments of the polynucleotides (nucleic acids) of the invention. In the present invention, a "polynucleotide fragment" refers to a polynucleotide having a nucleic acid sequence which, for example: is a portion of the cDNA contained in Clone ID NO:Z or the complementary strand thereto; is a portion of the polynucleotide sequence encoding the polypeptide encoded by the cDNA contained in Clone ID NO:Z or the complementary strand thereto; is a portion of a polynucleotide sequence encoding the amino acid sequence encoded by the region of SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or the complementary strand thereto; is a portion of the polynucleotide sequence of SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or the complementary strand thereto; is a portion of the polynucleotide sequence in



SEQ ID NO:X or the complementary strand thereto; is a polynucleotide sequence encoding a portion of the polypeptide of SEQ ID NO:Y; is a polynucleotide sequence encoding a portion of a polypeptide encoded by SEQ ID NO:X; is a polynucleotide sequence encoding a portion of a polypeptide encoded by the complement of the polynucleotide sequence in SEQ ID NO:X; is a portion of a polynucleotide sequence encoding the amino acid sequence encoded by the region of SEQ ID NO:B as defined in column 6 of Table 1B or the complementary strand thereto; or is a portion of the polynucleotide sequence of SEQ ID NO:B as defined in column 6 of Table 1B or the complementary strand thereto.

[121] The polynucleotide fragments of the invention are preferably at least about 15 nt, and more preferably at least about 20 nt, still more preferably at least about 30 nt, and even more preferably, at least about 40 nt, at least about 50 nt, at least about 75 nt, or at least about 150 nt in length. A fragment "at least 20 nt in length," for example, is intended to include 20 or more contiguous bases from the cDNA sequence contained in Clone ID NO:Z, or the nucleotide sequence shown in SEQ ID NO:X or the complementary stand thereto. In this context "about" includes the particularly recited value or a value larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. These nucleotide fragments have uses that include, but are not limited to, as diagnostic probes and primers as discussed herein. Of course, larger fragments (e.g., at least 160, 170, 180, 190, 200, 250, 500, 600, 1000, or 2000 nucleotides in length ) are also encompassed by the invention.

[122] Moreover, representative examples of polynucleotide fragments of the invention comprise, or alternatively consist of, a sequence from about nucleotide number 1-50, 51-100, 101-150, 151-200, 201-250, 251-300, 301-350, 351-400, 401-450, 451-500, 501-550, 551-600, 601-650, 651-700, 701-750, 751-800, 801-850, 851-900, 901-950, 951-1000, 1001-1050, 1051-1100, 1101-1150, 1151-1200, 1201-1250, 1251-1300, 1301-1350, 1351-1400, 1401-1450, 1451-1500, 1501-1550, 1551-1600, 1601-1650, 1651-1700, 1701-1750, 1751-1800, 1801-1850, 1851-1900, 1901-1950, 1951-2000, 2001-2050, 2051-2100, 2101-2150, 2151-2200, 2201-2250, 2251-2300, 2301-2350, 2351-2400, 2401-2450, 2451-2500, 2501-2550, 2551-2600, 2601-2650, 2651-2700, 2701-2750, 2751-2800, 2801-2850, 2851-2900, 2901-2950, 2951-3000, 3001-3050, 3051-3100, 3101-3150, 3151-3200, 3201-3250, 3251-3300, 3301-3350, 3351-3400, 3401-3450, 3451-3500, 3501-3550, 3551-3600, 3601-3650, 3651-3700, 3701-3750, 3751-3800, 3801-3850, 3851-3900, 3901-3950, 3951-4000, 4001-4050, 4051-4100, 4101-4150, 4151-4200, 4201-4250, 4251-4300, 4301-4350, 4351-

4400, 4401-4450, 4451-4500, 4501-4550, 4551-4600, 4601-4650, 4651-4700, 4701-4750, 4751-4800, 4801-4850, 4851-4900, 4901-4950, 4951-5000, 5001-5050, 5051-5100, 5101-5150, 5151-5200, 5201-5250, 5251-5300, 5301-5350, 5351-5400, 5401-5450, 5451-5500, 5501-5550, 5551-5600, 5601-5650, 5651-5700, 5701-5750, 5751-5800, 5801-5850, 5851-5900, 5901-5950, 5951-6000, 6001-6050, 6051-6100, 6101-6150, 6151-6200, 6201-6250, 6251-6300, 6301-6350, 6351-6400, 6401-6450, 6451-6500, 6501-6550, 6551-6600, 6601-6650, 6651-6700, 6701-6750, 6751-6800, 6801-6850, 6851-6900, 6901-6950, 6951-7000, 7001-7050, 7051-7100, 7101-7150, 7151-7200, 7201-7250, 7251-7300 or 7301 to the end of SEQ ID NO:X, or the complementary strand thereto. In this context "about" includes the particularly recited range or a range larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. Preferably, these fragments encode a polypeptide which has a functional activity (e.g., biological activity). More preferably, these polynucleotides can be used as probes or primers as discussed herein. Polynucleotides which hybridize to one or more of these polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions are also encompassed by the invention, as are polypeptides encoded by these polynucleotides.

[123] Further representative examples of polynucleotide fragments of the invention comprise, or alternatively consist of, a sequence from about nucleotide number 1-50, 51-100, 101-150, 151-200, 201-250, 251-300, 301-350, 351-400, 401-450, 451-500, 501-550, 551-600, 601-650, 651-700, 701-750, 751-800, 801-850, 851-900, 901-950, 951-1000, 1001-1050, 1051-1100, 1101-1150, 1151-1200, 1201-1250, 1251-1300, 1301-1350, 1351-1400, 1401-1450, 1451-1500, 1501-1550, 1551-1600, 1601-1650, 1651-1700, 1701-1750, 1751-1800, 1801-1850, 1851-1900, 1901-1950, 1951-2000, 2001-2050, 2051-2100, 2101-2150, 2151-2200, 2201-2250, 2251-2300, 2301-2350, 2351-2400, 2401-2450, 2451-2500, 2501-2550, 2551-2600, 2601-2650, 2651-2700, 2701-2750, 2751-2800, 2801-2850, 2851-2900, 2901-2950, 2951-3000, 3001-3050, 3051-3100, 3101-3150, 3151-3200, 3201-3250, 3251-3300, 3301-3350, 3351-3400, 3401-3450, 3451-3500, 3501-3550, 3551-3600, 3601-3650, 3651-3700, 3701-3750, 3751-3800, 3801-3850, 3851-3900, 3901-3950, 3951-4000, 4001-4050, 4051-4100, 4101-4150, 4151-4200, 4201-4250, 4251-4300, 4301-4350, 4351-4400, 4401-4450, 4451-4500, 4501-4550, 4551-4600, 4601-4650, 4651-4700, 4701-4750, 4751-4800, 4801-4850, 4851-4900, 4901-4950, 4951-5000, 5001-5050, 5051-5100, 5101-5150, 5151-5200, 5201-5250, 5251-5300, 5301-5350, 5351-5400, 5401-5450, 5451-5500, 5501-5550, 5551-5600, 5601-5650, 5651-5700, 5701-5750, 5751-5800, 5801-5850, 5851-

5900, 5901-5950, 5951-6000, 6001-6050, 6051-6100, 6101-6150, 6151-6200, 6201-6250, 6251-6300, 6301-6350, 6351-6400, 6401-6450, 6451-6500, 6501-6550, 6551-6600, 6601-6650, 6651-6700, 6701-6750, 6751-6800, 6801-6850, 6851-6900, 6901-6950, 6951-7000, 7001-7050, 7051-7100, 7101-7150, 7151-7200, 7201-7250, 7251-7300 or 7301 to the end of the cDNA sequence contained in Clone ID NO:Z, or the complementary strand thereto. In this context "about" includes the particularly recited range or a range larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. Preferably, these fragments encode a polypeptide which has a functional activity (e.g., biological activity). More preferably, these polynucleotides can be used as probes or primers as discussed herein. Polynucleotides which hybridize to one or more of these polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions are also encompassed by the invention, as are polypeptides encoded by these polynucleotides.

[124] Moreover, representative examples of polynucleotide fragments of the invention comprise, or alternatively consist of, a nucleic acid sequence comprising one, two, three, four, five, six, seven, eight, nine, ten, or more of the above described polynucleotide fragments of the invention in combination with a polynucleotide sequence delineated in Table 1B column 6. Additional, representative examples of polynucleotide fragments of the invention comprise, or alternatively consist of, a nucleic acid sequence comprising one, two, three, four, five, six, seven, eight, nine, ten, or more of the above described polynucleotide fragments of the invention in combination with a polynucleotide sequence that is the complementary strand of a sequence delineated in column 6 of Table 1B. In further embodiments, the above-described polynucleotide fragments of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotide fragments of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated Table 1B, column 6, and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that

bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides and polypeptides are also encompassed by the invention.

[125] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more fragments of the sequences delineated in column 6 of Table 1B, and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1B, column 2) or fragments or variants thereof. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[126] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more fragments of the sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1), and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1A or 1B) or fragments or variants thereof. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[127] In further specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more fragments of the sequences delineated in the same row of column 6 of Table 1B, and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1A or 1B) or fragments or variants thereof. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[128] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of the sequence of SEQ ID NO:X are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids that encode these polypeptides, and antibodies that

bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[129] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of a fragment or variant of the sequence of SEQ ID NO:X (e.g., as described herein) are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[130] In further specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of a fragment or variant of the sequence of SEQ ID NO:X and the 5' 10 polynucleotides of the sequence of one of the sequences delineated in column 6 of Table 1B are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[131] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of another sequence in column 6 are directly contiguous. In preferred embodiments, the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B is directly contiguous with the 5' 10 polynucleotides of the next sequential exon delineated in Table 1B, column 6. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower

stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[132] In the present invention, a "polypeptide fragment" refers to an amino acid sequence which is a portion of that contained in SEQ ID NO:Y, a portion of an amino acid sequence encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, a portion of an amino acid sequence encoded by the polynucleotide sequence of SEQ ID NO:X, a portion of an amino acid sequence encoded by the complement of the polynucleotide sequence in SEQ ID NO:X, and/or a portion of an amino acid sequence encoded by the cDNA contained in Clone ID NO:Z. Protein (polypeptide) fragments may be "free-standing," or comprised within a larger polypeptide of which the fragment forms a part or region, most preferably as a single continuous region. Representative examples of polypeptide fragments of the invention, include, for example, fragments comprising, or alternatively consisting of, from about amino acid number 1-20, 21-40, 41-60, 61-80, 81-100, 101-120, 121-140, 141-160, 161-180, 181-200, 201-220, 221-240, 241-260, 261-280, 281-300, 301-320, 321-340, 341-360, 361-380, 381-400, 401-420, 421-440, 441-460, 461-480, 481-500, 501-520, 521-540, 541-560, 561-580, 581-600, 601-620, 621-640, 641-660, 661-680, 681-700, 701-720, 721-740, 741-760, 761-780, 781-800, 801-820, 821-840, 841-860, 861-880, 881-900, 901-920, 921-940, 941-960, 961-980, 981-1000, 1001-1020, 1021-1040, 1041-1060, 1061-1080, 1081-1100, 1101-1120, 1121-1140, 1141-1160, 1161-1180, 1181-1200, 1201-1220, 1221-1240, 1241-1260, 1261-1280, 1281-1300, 1301-1320, 1321-1340, 1341-1360, 1361-1380, 1381-1400, 1401-1420, 1421-1440, or 1441 to the end of the coding region of cDNA and SEQ ID NO: Y. In a preferred embodiment, polypeptide fragments of the invention include, for example, fragments comprising, or alternatively consisting of, from about amino acid number 1-20, 21-40, 41-60, 61-80, 81-100, 101-120, 121-140, 141-160, 161-180, 181-200, 201-220, 221-240, 241-260, 261-280, 281-300, 301-320, 321-340, 341-360, 361-380, 381-400, 401-420, 421-440, 441-460, 461-480, 481-500, 501-520, 521-540, 541-560, 561-580, 581-600, 601-620, 621-640, 641-660, 661-680, 681-700, 701-720, 721-740, 741-760, 761-780, 781-800, 801-820, 821-840, 841-860, 861-880, 881-900, 901-920, 921-940, 941-960, 961-980, 981-1000, 1001-1020, 1021-1040, 1041-1060, 1061-1080, 1081-1100, 1101-1120, 1121-1140, 1141-1160, 1161-1180, 1181-1200,

1201-1220, 1221-1240, 1241-1260, 1261-1280, 1281-1300, 1301-1320, 1321-1340, 1341-1360, 1361-1380, 1381-1400, 1401-1420, 1421-1440, or 1441 to the end of the coding region of SEQ ID NO:Y. Moreover, polypeptide fragments of the invention may be at least about 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 100, 110, 120, 130, 140, or 150 amino acids in length. In this context "about" includes the particularly recited ranges or values, or ranges or values larger or smaller by several (5, 4, 3, 2, or 1) amino acids, at either extreme or at both extremes. Polynucleotides encoding these polypeptide fragments are also encompassed by the invention.

[133] Even if deletion of one or more amino acids from the N-terminus of a protein results in modification or loss of one or more biological functions of the protein, other functional activities (e.g., biological activities, ability to multimerize, ability to bind a ligand) may still be retained. For example, the ability of shortened muteins to induce and/or bind to antibodies which recognize the complete or mature forms of the polypeptides generally will be retained when less than the majority of the residues of the complete or mature polypeptide are removed from the N-terminus. Whether a particular polypeptide lacking N-terminal residues of a complete polypeptide retains such immunologic activities can readily be determined by routine methods described herein and otherwise known in the art. It is not unlikely that a mutein with a large number of deleted N-terminal amino acid residues may retain some biological or immunogenic activities. In fact, peptides composed of as few as six amino acid residues may often evoke an immune response.

[134] Accordingly, polypeptide fragments include the secreted protein as well as the mature form. Further preferred polypeptide fragments include the secreted protein or the mature form having a continuous series of deleted residues from the amino or the carboxy terminus, or both. For example, any number of amino acids, ranging from 1-60, can be deleted from the amino terminus of either the secreted polypeptide or the mature form. Similarly, any number of amino acids, ranging from 1-30, can be deleted from the carboxy terminus of the secreted protein or mature form. Furthermore, any combination of the above amino and carboxy terminus deletions are preferred. Similarly, polynucleotides encoding these polypeptide fragments are also preferred.

[135] The present invention further provides polypeptides having one or more residues deleted from the amino terminus of the amino acid sequence of a polypeptide disclosed herein (e.g., a polypeptide of SEQ ID NO:Y, a polypeptide encoded by the polynucleotide sequence contained in SEQ ID NO:X or the complement thereof, a polypeptide encoded by

the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, a polypeptide encoded by the portion of SEQ ID NO:B as defined in column 6 of Table 1B, and/or a polypeptide encoded by the cDNA contained in Clone ID NO:Z). In particular, N-terminal deletions may be described by the general formula m-q, where q is a whole integer representing the total number of amino acid residues in a polypeptide of the invention (e.g., the polypeptide disclosed in SEQ ID NO:Y, or the polypeptide encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2), and m is defined as any integer ranging from 2 to q-6. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[136] The present invention further provides polypeptides having one or more residues from the carboxy terminus of the amino acid sequence of a polypeptide disclosed herein (e.g., a polypeptide of SEQ ID NO:Y, a polypeptide encoded by the polynucleotide sequence contained in SEQ ID NO:X, a polypeptide encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, and/or a polypeptide encoded by the cDNA contained in Clone ID NO:Z). In particular, C-terminal deletions may be described by the general formula 1-n, where n is any whole integer ranging from 6 to q-1, and where n corresponds to the position of amino acid residue in a polypeptide of the invention. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[137] In addition, any of the above described N- or C-terminal deletions can be combined to produce a N- and C-terminal deleted polypeptide. The invention also provides polypeptides having one or more amino acids deleted from both the amino and the carboxyl termini, which may be described generally as having residues m-n of a polypeptide encoded by SEQ ID NO:X (e.g., including, but not limited to, the preferred polypeptide disclosed as SEQ ID NO:Y and the polypeptide encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2), the cDNA contained in Clone ID NO:Z, and/or the complement thereof, where n and m are integers as described above. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[138] Also as mentioned above, even if deletion of one or more amino acids from the C-terminus of a protein results in modification of loss of one or more biological functions of the protein, other functional activities (e.g., biological activities, ability to multimerize, ability to bind a ligand) may still be retained. For example the ability of the shortened mutein to induce and/or bind to antibodies which recognize the complete or mature forms of the polypeptide generally will be retained when less than the majority of the residues of the



complete or mature polypeptide are removed from the C-terminus. Whether a particular polypeptide lacking C-terminal residues of a complete polypeptide retains such immunologic activities can readily be determined by routine methods described herein and otherwise known in the art. It is not unlikely that a mutein with a large number of deleted C-terminal amino acid residues may retain some biological or immunogenic activities. In fact, peptides composed of as few as six amino acid residues may often evoke an immune response.

[139] The present application is also directed to proteins containing polypeptides at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to a polypeptide sequence set forth herein. In preferred embodiments, the application is directed to proteins containing polypeptides at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to polypeptides having the amino acid sequence of the specific N- and C-terminal deletions. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[140] Any polypeptide sequence encoded by, for example, the polynucleotide sequences set forth as SEQ ID NO:X or the complement thereof, (presented, for example, in Tables 1A and 2), the cDNA contained in Clone ID NO:Z, or the polynucleotide sequence as defined in column 6 of Table 1B, may be analyzed to determine certain preferred regions of the polypeptide. For example, the amino acid sequence of a polypeptide encoded by a polynucleotide sequence of SEQ ID NO:X (e.g., the polypeptide of SEQ ID NO:Y and the polypeptide encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2) or the cDNA contained in Clone ID NO:Z may be analyzed using the default parameters of the DNASTAR computer algorithm (DNASTAR, Inc., 1228 S. Park St., Madison, WI 53715 USA; <http://www.dnastar.com/>).

[141] Polypeptide regions that may be routinely obtained using the DNASTAR computer algorithm include, but are not limited to, Garnier-Robson alpha-regions, beta-regions, turn-regions, and coil-regions; Chou-Fasman alpha-regions, beta-regions, and turn-regions; Kyte-Doolittle hydrophilic regions and hydrophobic regions; Eisenberg alpha- and beta-amphipathic regions; Karplus-Schulz flexible regions; Emini surface-forming regions; and Jameson-Wolf regions of high antigenic index. Among highly preferred polynucleotides of the invention in this regard are those that encode polypeptides comprising regions that combine several structural features, such as several (e.g., 1, 2, 3 or 4) of the features set out above.

[142] Additionally, Kyte-Doolittle hydrophilic regions and hydrophobic regions, Emini surface-forming regions, and Jameson-Wolf regions of high antigenic index (i.e., containing four or more contiguous amino acids having an antigenic index of greater than or equal to 1.5, as identified using the default parameters of the Jameson-Wolf program) can routinely be used to determine polypeptide regions that exhibit a high degree of potential for antigenicity. Regions of high antigenicity are determined from data by DNASTAR analysis by choosing values which represent regions of the polypeptide which are likely to be exposed on the surface of the polypeptide in an environment in which antigen recognition may occur in the process of initiation of an immune response.

[143] Preferred polypeptide fragments of the invention are fragments comprising, or alternatively, consisting of, an amino acid sequence that displays a functional activity (e.g. biological activity) of the polypeptide sequence of which the amino acid sequence is a fragment. By a polypeptide displaying a "functional activity" is meant a polypeptide capable of one or more known functional activities associated with a full-length protein, such as, for example, biological activity, antigenicity, immunogenicity, and/or multimerization, as described herein.

[144] Other preferred polypeptide fragments are biologically active fragments. Biologically active fragments are those exhibiting activity similar, but not necessarily identical, to an activity of the polypeptide of the present invention. The biological activity of the fragments may include an improved desired activity, or a decreased undesirable activity.

[145] In preferred embodiments, polypeptides of the invention comprise, or alternatively consist of, one, two, three, four, five or more of the antigenic fragments of the polypeptide of SEQ ID NO:Y, or portions thereof. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[146] The present invention encompasses polypeptides comprising, or alternatively consisting of, an epitope of: the polypeptide sequence shown in SEQ ID NO:Y; a polypeptide sequence encoded by SEQ ID NO:X or the complementary strand thereto; the polypeptide sequence encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2; the polypeptide sequence encoded by the portion of SEQ ID NO:B as defined in column 6 of Table 1B or the complement thereto; the polypeptide sequence encoded by the cDNA contained in Clone ID NO:Z; or the polypeptide sequence encoded by a polynucleotide that hybridizes to the sequence of SEQ ID NO:X, the complement of the

sequence of SEQ ID NO:X, the complement of a portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, or the cDNA sequence contained in Clone ID NO:Z under stringent hybridization conditions or alternatively, under lower stringency hybridization as defined *supra*. The present invention further encompasses polynucleotide sequences encoding an epitope of a polypeptide sequence of the invention (such as, for example, the sequence disclosed in SEQ ID NO:X, or a fragment thereof), polynucleotide sequences of the complementary strand of a polynucleotide sequence encoding an epitope of the invention, and polynucleotide sequences which hybridize to the complementary strand under stringent hybridization conditions or alternatively, under lower stringency hybridization conditions defined *supra*.

[147] The term "epitopes," as used herein, refers to portions of a polypeptide having antigenic or immunogenic activity in an animal, preferably a mammal, and most preferably in a human. In a preferred embodiment, the present invention encompasses a polypeptide comprising an epitope, as well as the polynucleotide encoding this polypeptide. An "immunogenic epitope," as used herein, is defined as a portion of a protein that elicits an antibody response in an animal, as determined by any method known in the art, for example, by the methods for generating antibodies described *infra*. (See, for example, Geysen et al., Proc. Natl. Acad. Sci. USA 81:3998- 4002 (1983)). The term "antigenic epitope," as used herein, is defined as a portion of a protein to which an antibody can immunospecifically bind its antigen as determined by any method well known in the art, for example, by the immunoassays described herein. Immunospecific binding excludes non-specific binding but does not necessarily exclude cross- reactivity with other antigens. Antigenic epitopes need not necessarily be immunogenic.

[148] Fragments which function as epitopes may be produced by any conventional means. (See, e.g., Houghten, R. A., Proc. Natl. Acad. Sci. USA 82:5131-5135 (1985) further described in U.S. Patent No. 4,631,211.)

[149] In the present invention, antigenic epitopes preferably contain a sequence of at least 4, at least 5, at least 6, at least 7, more preferably at least 8, at least 9, at least 10, at least 11, at least 12, at least 13, at least 14, at least 15, at least 20, at least 25, at least 30, at least 40, at least 50, and, most preferably, between about 15 to about 30 amino acids. Preferred polypeptides comprising immunogenic or antigenic epitopes are at least 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, or 100 amino acid residues in length. Additional non-exclusive preferred antigenic epitopes include the antigenic

epitopes disclosed herein, as well as portions thereof. Antigenic epitopes are useful, for example, to raise antibodies, including monoclonal antibodies, that specifically bind the epitope. Preferred antigenic epitopes include the antigenic epitopes disclosed herein, as well as any combination of two, three, four, five or more of these antigenic epitopes. Antigenic epitopes can be used as the target molecules in immunoassays. (See, for instance, Wilson et al., Cell 37:767-778 (1984); Sutcliffe et al., Science 219:660-666 (1983)).

[150] Non-limiting examples of epitopes of polypeptides that can be used to generate antibodies of the invention include a polypeptide comprising, or alternatively consisting of, at least one, two, three, four, five, six or more of the portion(s) of SEQ ID NO:Y specified in column 7 of Table 1A. These polypeptide fragments have been determined to bear antigenic epitopes of the proteins of the invention by the analysis of the Jameson-Wolf antigenic index which is included in the DNASTar suite of computer programs. By "comprise" it is intended that a polypeptide contains at least one, two, three, four, five, six or more of the portion(s) of SEQ ID NO:Y shown in column 7 of Table 1A, but it may contain additional flanking residues on either the amino or carboxyl termini of the recited portion. Such additional flanking sequences are preferably sequences naturally found adjacent to the portion; i.e., contiguous sequence shown in SEQ ID NO:Y. The flanking sequence may, however, be sequences from a heterologous polypeptide, such as from another protein described herein or from a heterologous polypeptide not described herein. In particular embodiments, epitope portions of a polypeptide of the invention comprise one, two, three, or more of the portions of SEQ ID NO:Y shown in column 7 of Table 1A.

[151] Similarly, immunogenic epitopes can be used, for example, to induce antibodies according to methods well known in the art. See, for instance, Sutcliffe et al., *supra*; Wilson et al., *supra*; Chow et al., Proc. Natl. Acad. Sci. USA 82:910-914; and Bittle et al., J. Gen. Virol. 66:2347-2354 (1985). Preferred immunogenic epitopes include the immunogenic epitopes disclosed herein, as well as any combination of two, three, four, five or more of these immunogenic epitopes. The polypeptides comprising one or more immunogenic epitopes may be presented for eliciting an antibody response together with a carrier protein, such as an albumin, to an animal system (such as rabbit or mouse), or, if the polypeptide is of sufficient length (at least about 25 amino acids), the polypeptide may be presented without a carrier. However, immunogenic epitopes comprising as few as 8 to 10 amino acids have been shown to be sufficient to raise antibodies capable of binding to, at the very least, linear epitopes in a denatured polypeptide (e.g., in Western blotting).

[152] Epitope-bearing polypeptides of the present invention may be used to induce antibodies according to methods well known in the art including, but not limited to, *in vivo* immunization, *in vitro* immunization, and phage display methods. See, e.g., Sutcliffe et al., *supra*; Wilson et al., *supra*, and Bittle et al., J. Gen. Virol., 66:2347-2354 (1985). If *in vivo* immunization is used, animals may be immunized with free peptide; however, anti-peptide antibody titer may be boosted by coupling the peptide to a macromolecular carrier, such as keyhole limpet hemacyanin (KLH) or tetanus toxoid. For instance, peptides containing cysteine residues may be coupled to a carrier using a linker such as maleimidobenzoyl- N-hydroxysuccinimide ester (MBS), while other peptides may be coupled to carriers using a more general linking agent such as glutaraldehyde. Animals such as rabbits, rats and mice are immunized with either free or carrier- coupled peptides, for instance, by intraperitoneal and/or intradermal injection of emulsions containing about 100 µg of peptide or carrier protein and Freund's adjuvant or any other adjuvant known for stimulating an immune response. Several booster injections may be needed, for instance, at intervals of about two weeks, to provide a useful titer of anti-peptide antibody which can be detected, for example, by ELISA assay using free peptide adsorbed to a solid surface. The titer of anti-peptide antibodies in serum from an immunized animal may be increased by selection of anti-peptide antibodies, for instance, by adsorption to the peptide on a solid support and elution of the selected antibodies according to methods well known in the art.

[153] As one of skill in the art will appreciate, and as discussed above, the polypeptides of the present invention (e.g., those comprising an immunogenic or antigenic epitope) can be fused to heterologous polypeptide sequences. For example, polypeptides of the present invention (including fragments or variants thereof), may be fused with the constant domain of immunoglobulins (IgA, IgE, IgG, IgM), or portions thereof (CH1, CH2, CH3, or any combination thereof and portions thereof, resulting in chimeric polypeptides. By way of another non-limiting example, polypeptides and/or antibodies of the present invention (including fragments or variants thereof) may be fused with albumin (including but not limited to recombinant human serum albumin or fragments or variants thereof (see, e.g., U.S. Patent No. 5,876,969, issued March 2, 1999, EP Patent 0 413 622, and U.S. Patent No. 5,766,883, issued June 16, 1998, herein incorporated by reference in their entirety)). In a preferred embodiment, polypeptides and/or antibodies of the present invention (including fragments or variants thereof) are fused with the mature form of human serum albumin (i.e.,

amino acids 1 – 585 of human serum albumin as shown in Figures 1 and 2 of EP Patent 0 322 094) which is herein incorporated by reference in its entirety. In another preferred embodiment, polypeptides and/or antibodies of the present invention (including fragments or variants thereof) are fused with polypeptide fragments comprising, or alternatively consisting of, amino acid residues 1-z of human serum albumin, where z is an integer from 369 to 419, as described in U.S. Patent 5,766,883 herein incorporated by reference in its entirety. Polypeptides and/or antibodies of the present invention (including fragments or variants thereof) may be fused to either the N- or C-terminal end of the heterologous protein (e.g., immunoglobulin Fc polypeptide or human serum albumin polypeptide). Polynucleotides encoding fusion proteins of the invention are also encompassed by the invention.

[154] Such fusion proteins as those described above may facilitate purification and may increase half-life *in vivo*. This has been shown for chimeric proteins consisting of the first two domains of the human CD4-polypeptide and various domains of the constant regions of the heavy or light chains of mammalian immunoglobulins. See, e.g., EP 394,827; Traunecker et al., Nature, 331:84-86 (1988). Enhanced delivery of an antigen across the epithelial barrier to the immune system has been demonstrated for antigens (e.g., insulin) conjugated to an FcRn binding partner such as IgG or Fc fragments (see, e.g., PCT Publications WO 96/22024 and WO 99/04813). IgG fusion proteins that have a disulfide-linked dimeric structure due to the IgG portion desulfide bonds have also been found to be more efficient in binding and neutralizing other molecules than monomeric polypeptides or fragments thereof alone. See, e.g., Fountoulakis et al., J. Biochem., 270:3958-3964 (1995). Nucleic acids encoding the above epitopes can also be recombined with a gene of interest as an epitope tag (e.g., the hemagglutinin (HA) tag or flag tag) to aid in detection and purification of the expressed polypeptide. For example, a system described by Janknecht et al. allows for the ready purification of non-denatured fusion proteins expressed in human cell lines (Janknecht et al., 1991, Proc. Natl. Acad. Sci. USA 88:8972-897). In this system, the gene of interest is subcloned into a vaccinia recombination plasmid such that the open reading frame of the gene is translationally fused to an amino-terminal tag consisting of six histidine residues. The tag serves as a matrix binding domain for the fusion protein. Extracts from cells infected with the recombinant vaccinia virus are loaded onto Ni<sup>2+</sup> nitriloacetic acid-agarose column and histidine-tagged proteins can be selectively eluted with imidazole-containing buffers.

### *Fusion Proteins*

[155] Any polypeptide of the present invention can be used to generate fusion proteins. For example, the polypeptide of the present invention, when fused to a second protein, can be used as an antigenic tag. Antibodies raised against the polypeptide of the present invention can be used to indirectly detect the second protein by binding to the polypeptide. Moreover, because secreted proteins target cellular locations based on trafficking signals, polypeptides of the present invention which are shown to be secreted can be used as targeting molecules once fused to other proteins.

[156] Examples of domains that can be fused to polypeptides of the present invention include not only heterologous signal sequences, but also other heterologous functional regions. The fusion does not necessarily need to be direct, but may occur through linker sequences.

[157] In certain preferred embodiments, proteins of the invention are fusion proteins comprising an amino acid sequence that is an N and/or C- terminal deletion of a polypeptide of the invention. In preferred embodiments, the invention is directed to a fusion protein comprising an amino acid sequence that is at least 90%, 95%, 96%, 97%, 98% or 99% identical to a polypeptide sequence of the invention. Polynucleotides encoding these proteins are also encompassed by the invention.

[158] Moreover, fusion proteins may also be engineered to improve characteristics of the polypeptide of the present invention. For instance, a region of additional amino acids, particularly charged amino acids, may be added to the N-terminus of the polypeptide to improve stability and persistence during purification from the host cell or subsequent handling and storage. Also, peptide moieties may be added to the polypeptide to facilitate purification. Such regions may be removed prior to final preparation of the polypeptide. The addition of peptide moieties to facilitate handling of polypeptides are familiar and routine techniques in the art.

[159] As one of skill in the art will appreciate that, as discussed above, polypeptides of the present invention, and epitope-bearing fragments thereof, can be combined with heterologous polypeptide sequences. For example, the polypeptides of the present invention may be fused with heterologous polypeptide sequences, for example, the polypeptides of the present invention may be fused with the constant domain of immunoglobulins (IgA, IgE, IgG, IgM) or portions thereof (CH1, CH2, CH3, and any

combination thereof, including both entire domains and portions thereof), or albumin (including, but not limited to, native or recombinant human albumin or fragments or variants thereof (see, e.g., U.S. Patent No. 5,876,969, issued March 2, 1999, EP Patent 0 413 622, and U.S. Patent No. 5,766,883, issued June 16, 1998, herein incorporated by reference in their entirety)), resulting in chimeric polypeptides. For example, EP-A-O 464 533 (Canadian counterpart 2045869) discloses fusion proteins comprising various portions of constant region of immunoglobulin molecules together with another human protein or part thereof. In many cases, the Fc part in a fusion protein is beneficial in therapy and diagnosis, and thus can result in, for example, improved pharmacokinetic properties (EP-A 0232 262). Alternatively, deleting the Fc part after the fusion protein has been expressed, detected, and purified, would be desired. For example, the Fc portion may hinder therapy and diagnosis if the fusion protein is used as an antigen for immunizations. In drug discovery, for example, human proteins, such as hIL-5, have been fused with Fc portions for the purpose of high-throughput screening assays to identify antagonists of hIL-5. See, D. Bennett et al., *J. Molecular Recognition* 8:52-58 (1995); K. Johanson et al., *J. Biol. Chem.* 270:9459-9471 (1995).

[160] Moreover, the polypeptides of the present invention can be fused to marker sequences, such as a polypeptide which facilitates purification of the fused polypeptide. In preferred embodiments, the marker amino acid sequence is a hexa-histidine peptide, such as the tag provided in a pQE vector (QIAGEN, Inc., 9259 Eton Avenue, Chatsworth, CA, 91311), among others, many of which are commercially available. As described in Gentz et al., *Proc. Natl. Acad. Sci. USA* 86:821-824 (1989), for instance, hexa-histidine provides for convenient purification of the fusion protein. Another peptide tag useful for purification, the "HA" tag, corresponds to an epitope derived from the influenza hemagglutinin protein (Wilson et al., *Cell* 37:767 (1984)).

[161] Additional fusion proteins of the invention may be generated through the techniques of gene-shuffling, motif-shuffling, exon-shuffling, and/or codon-shuffling (collectively referred to as "DNA shuffling"). DNA shuffling may be employed to modulate the activities of polypeptides of the invention, such methods can be used to generate polypeptides with altered activity, as well as agonists and antagonists of the polypeptides. See, generally, U.S. Patent Nos. 5,605,793; 5,811,238; 5,830,721; 5,834,252; and 5,837,458, and Patten et al., *Curr. Opinion Biotechnol.* 8:724-33 (1997); Harayama, *Trends Biotechnol.* 16(2):76-82 (1998); Hansson, et al., *J. Mol. Biol.* 287:265-76 (1999);



and Lorenzo and Blasco, Biotechniques 24(2):308- 13 (1998) (each of these patents and publications are hereby incorporated by reference in its entirety). In one embodiment, alteration of polynucleotides corresponding to SEQ ID NO:X and the polypeptides encoded by these polynucleotides may be achieved by DNA shuffling. DNA shuffling involves the assembly of two or more DNA segments by homologous or site-specific recombination to generate variation in the polynucleotide sequence. In another embodiment, polynucleotides of the invention, or the encoded polypeptides, may be altered by being subjected to random mutagenesis by error-prone PCR, random nucleotide insertion or other methods prior to recombination. In another embodiment, one or more components, motifs, sections, parts, domains, fragments, etc., of a polynucleotide encoding a polypeptide of the invention may be recombined with one or more components, motifs, sections, parts, domains, fragments, etc. of one or more heterologous molecules.

[162] Thus, any of these above fusions can be engineered using the polynucleotides or the polypeptides of the present invention.

#### Recombinant and Synthetic Production of Polypeptides of the Invention

[163] The present invention also relates to vectors containing the polynucleotide of the present invention, host cells, and the production of polypeptides by synthetic and recombinant techniques. The vector may be, for example, a phage, plasmid, viral, or retroviral vector. Retroviral vectors may be replication competent or replication defective. In the latter case, viral propagation generally will occur only in complementing host cells.

[164] The polynucleotides of the invention may be joined to a vector containing a selectable marker for propagation in a host. Generally, a plasmid vector is introduced in a precipitate, such as a calcium phosphate precipitate, or in a complex with a charged lipid. If the vector is a virus, it may be packaged in vitro using an appropriate packaging cell line and then transduced into host cells.

[165] The polynucleotide insert should be operatively linked to an appropriate promoter, such as the phage lambda PL promoter, the E. coli lac, trp, phoA and tac promoters, the SV40 early and late promoters and promoters of retroviral LTRs, to name a few. Other suitable promoters will be known to the skilled artisan. The expression constructs will further contain sites for transcription initiation, termination, and, in the transcribed region, a ribosome binding site for translation. The coding portion of the transcripts expressed by the constructs will preferably include a translation initiating codon

at the beginning and a termination codon (UAA, UGA or UAG) appropriately positioned at the end of the polypeptide to be translated.

[166] As indicated, the expression vectors will preferably include at least one selectable marker. Such markers include dihydrofolate reductase, G418, glutamine synthase, or neomycin resistance for eukaryotic cell culture, and tetracycline, kanamycin or ampicillin resistance genes for culturing in *E. coli* and other bacteria. Representative examples of appropriate hosts include, but are not limited to, bacterial cells, such as *E. coli*, *Streptomyces* and *Salmonella typhimurium* cells; fungal cells, such as yeast cells (e.g., *Saccharomyces cerevisiae* or *Pichia pastoris* (ATCC Accession No. 201178)); insect cells such as *Drosophila* S2 and *Spodoptera Sf9* cells; animal cells such as CHO, COS, 293, and Bowes melanoma cells; and plant cells. Appropriate culture mediums and conditions for the above-described host cells are known in the art.

[167] Among vectors preferred for use in bacteria include pQE70, pQE60 and pQE-9, available from QIAGEN, Inc.; pBluescript vectors, Phagescript vectors, pNH8A, pNH16a, pNH18A, pNH46A, available from Stratagene Cloning Systems, Inc.; and ptrc99a, pKK223-3, pKK233-3, pDR540, pRIT5 available from Pharmacia Biotech, Inc. Among preferred eukaryotic vectors are pWLNEO, pSV2CAT, pOG44, pXT1 and pSG available from Stratagene; and pSVK3, pBPV, pMSG and pSVL available from Pharmacia. Preferred expression vectors for use in yeast systems include, but are not limited to pYES2, pYD1, pTEF1/Zeo, pYES2/GS, pPICZ, pGAPZ, pGAPZalph, pPIC9, pPIC3.5, pHIL-D2, pHIL-S1, pPIC3.5K, pPIC9K, and PAO815 (all available from Invitrogen, Carlsbad, CA). Other suitable vectors will be readily apparent to the skilled artisan.

[168] Vectors which use glutamine synthase (GS) or DHFR as the selectable markers can be amplified in the presence of the drugs methionine sulfoximine or methotrexate, respectively. An advantage of glutamine synthase based vectors are the availability of cell lines (e.g., the murine myeloma cell line, NS0) which are glutamine synthase negative. Glutamine synthase expression systems can also function in glutamine synthase expressing cells (e.g., Chinese Hamster Ovary (CHO) cells) by providing additional inhibitor to prevent the functioning of the endogenous gene. A glutamine synthase expression system and components thereof are detailed in PCT publications: WO87/04462; WO86/05807; WO89/01036; WO89/10404; and WO91/06657, which are hereby incorporated in their entireties by reference herein. Additionally, glutamine synthase expression vectors can be obtained from Lonza Biologics, Inc. (Portsmouth, NH). Expression and production of

monoclonal antibodies using a GS expression system in murine myeloma cells is described in Bebbington *et al.*, *Bio/technology* 10:169(1992) and in Biblia and Robinson *Biotechnol. Prog.* 11:1 (1995) which are herein incorporated by reference.

[169] The present invention also relates to host cells containing the above-described vector constructs described herein, and additionally encompasses host cells containing nucleotide sequences of the invention that are operably associated with one or more heterologous control regions (e.g., promoter and/or enhancer) using techniques known of in the art. The host cell can be a higher eukaryotic cell, such as a mammalian cell (e.g., a human derived cell), or a lower eukaryotic cell, such as a yeast cell, or the host cell can be a prokaryotic cell, such as a bacterial cell. A host strain may be chosen which modulates the expression of the inserted gene sequences, or modifies and processes the gene product in the specific fashion desired. Expression from certain promoters can be elevated in the presence of certain inducers; thus expression of the genetically engineered polypeptide may be controlled. Furthermore, different host cells have characteristics and specific mechanisms for the translational and post-translational processing and modification (e.g., phosphorylation, cleavage) of proteins. Appropriate cell lines can be chosen to ensure the desired modifications and processing of the foreign protein expressed.

[170] Introduction of the nucleic acids and nucleic acid constructs of the invention into the host cell can be effected by calcium phosphate transfection, DEAE-dextran mediated transfection, cationic lipid-mediated transfection, electroporation, transduction, infection, or other methods. Such methods are described in many standard laboratory manuals, such as Davis *et al.*, *Basic Methods In Molecular Biology* (1986). It is specifically contemplated that the polypeptides of the present invention may in fact be expressed by a host cell lacking a recombinant vector.

[171] In addition to encompassing host cells containing the vector constructs discussed herein, the invention also encompasses primary, secondary, and immortalized host cells of vertebrate origin, particularly mammalian origin, that have been engineered to delete or replace endogenous genetic material (e.g., the coding sequence), and/or to include genetic material (e.g., heterologous polynucleotide sequences) that is operably associated with polynucleotides of the invention, and which activates, alters, and/or amplifies endogenous polynucleotides. For example, techniques known in the art may be used to operably associate heterologous control regions (e.g., promoter and/or enhancer) and endogenous polynucleotide sequences via homologous recombination (see, e.g., US Patent Number

5,641,670, issued June 24, 1997; International Publication Number WO 96/29411; International Publication Number WO 94/12650; Koller *et al.*, *Proc. Natl. Acad. Sci. USA* 86:8932-8935 (1989); and Zijlstra *et al.*, *Nature* 342:435-438 (1989), the disclosures of each of which are incorporated by reference in their entireties).

[172] Polypeptides of the invention can be recovered and purified from recombinant cell cultures by well-known methods including ammonium sulfate or ethanol precipitation, acid extraction, anion or cation exchange chromatography, phosphocellulose chromatography, hydrophobic interaction chromatography, affinity chromatography, hydroxylapatite chromatography and lectin chromatography. Most preferably, high performance liquid chromatography ("HPLC") is employed for purification.

[173] Polypeptides of the present invention can also be recovered from: products purified from natural sources, including bodily fluids, tissues and cells, whether directly isolated or cultured; products of chemical synthetic procedures; and products produced by recombinant techniques from a prokaryotic or eukaryotic host, including, for example, bacterial, yeast, higher plant, insect, and mammalian cells. Depending upon the host employed in a recombinant production procedure, the polypeptides of the present invention may be glycosylated or may be non-glycosylated. In addition, polypeptides of the invention may also include an initial modified methionine residue, in some cases as a result of host-mediated processes. Thus, it is well known in the art that the N-terminal methionine encoded by the translation initiation codon generally is removed with high efficiency from any protein after translation in all eukaryotic cells. While the N-terminal methionine on most proteins also is efficiently removed in most prokaryotes, for some proteins, this prokaryotic removal process is inefficient, depending on the nature of the amino acid to which the N-terminal methionine is covalently linked.

[174] In one embodiment, the yeast *Pichia pastoris* is used to express polypeptides of the invention in a eukaryotic system. *Pichia pastoris* is a methylotrophic yeast which can metabolize methanol as its sole carbon source. A main step in the methanol metabolism pathway is the oxidation of methanol to formaldehyde using O<sub>2</sub>. This reaction is catalyzed by the enzyme alcohol oxidase. In order to metabolize methanol as its sole carbon source, *Pichia pastoris* must generate high levels of alcohol oxidase due, in part, to the relatively low affinity of alcohol oxidase for O<sub>2</sub>. Consequently, in a growth medium depending on methanol as a main carbon source, the promoter region of one of the two alcohol oxidase

genes (*AOX1*) is highly active. In the presence of methanol, alcohol oxidase produced from the *AOX1* gene comprises up to approximately 30% of the total soluble protein in *Pichia pastoris*. See Ellis, S.B., *et al.*, *Mol. Cell. Biol.* 5:1111-21 (1985); Koutz, P.J., *et al.*, *Yeast* 5:167-77 (1989); Tschopp, J.F., *et al.*, *Nucl. Acids Res.* 15:3859-76 (1987). Thus, a heterologous coding sequence, such as, for example, a polynucleotide of the present invention, under the transcriptional regulation of all or part of the *AOX1* regulatory sequence is expressed at exceptionally high levels in *Pichia* yeast grown in the presence of methanol.

[175] In one example, the plasmid vector pPIC9K is used to express DNA encoding a polypeptide of the invention, as set forth herein, in a *Pichea* yeast system essentially as described in "*Pichia* Protocols: Methods in Molecular Biology," D.R. Higgins and J. Cregg, eds. The Humana Press, Totowa, NJ, 1998. This expression vector allows expression and secretion of a polypeptide of the invention by virtue of the strong *AOX1* promoter linked to the *Pichia pastoris* alkaline phosphatase (PHO) secretory signal peptide (i.e., leader) located upstream of a multiple cloning site.

[176] Many other yeast vectors could be used in place of pPIC9K, such as, pYES2, pYD1, pTEF1/Zeo, pYES2/GS, pPICZ, pGAPZ, pGAPZalpha, pPIC9, pPIC3.5, pHIL-D2, pHIL-S1, pPIC3.5K, and PAO815, as one skilled in the art would readily appreciate, as long as the proposed expression construct provides appropriately located signals for transcription, translation, secretion (if desired), and the like, including an in-frame AUG as required.

[177] In another embodiment, high-level expression of a heterologous coding sequence, such as, for example, a polynucleotide of the present invention, may be achieved by cloning the heterologous polynucleotide of the invention into an expression vector such as, for example, pGAPZ or pGAPZalpha, and growing the yeast culture in the absence of methanol.

[178] In addition to encompassing host cells containing the vector constructs discussed herein, the invention also encompasses primary, secondary, and immortalized host cells of vertebrate origin, particularly mammalian origin, that have been engineered to delete or replace endogenous genetic material (e.g., coding sequence), and/or to include genetic material (e.g., heterologous polynucleotide sequences) that is operably associated with

polynucleotides of the invention, and which activates, alters, and/or amplifies endogenous polynucleotides. For example, techniques known in the art may be used to operably associate heterologous control regions (e.g., promoter and/or enhancer) and endogenous polynucleotide sequences via homologous recombination (see, e.g., U.S. Patent No. 5,641,670, issued June 24, 1997; International Publication No. WO 96/29411, published September 26, 1996; International Publication No. WO 94/12650, published August 4, 1994; Koller et al., *Proc. Natl. Acad. Sci. USA* 86:8932-8935 (1989); and Zijlstra et al., *Nature* 342:435-438 (1989), the disclosures of each of which are incorporated by reference in their entireties).

[179] In addition, polypeptides of the invention can be chemically synthesized using techniques known in the art (e.g., see Creighton, 1983, *Proteins: Structures and Molecular Principles*, W.H. Freeman & Co., N.Y., and Hunkapiller et al., *Nature*, 310:105-111 (1984)). For example, a polypeptide corresponding to a fragment of a polypeptide can be synthesized by use of a peptide synthesizer. Furthermore, if desired, nonclassical amino acids or chemical amino acid analogs can be introduced as a substitution or addition into the polypeptide sequence. Non-classical amino acids include, but are not limited to, to the D-isomers of the common amino acids, 2,4-diaminobutyric acid,  $\alpha$ -amino isobutyric acid, 4-aminobutyric acid, Abu, 2-amino butyric acid, g-Abu, e-Ahx, 6-amino hexanoic acid, Aib, 2-amino isobutyric acid, 3-amino propionic acid, ornithine, norleucine, norvaline, hydroxyproline, sarcosine, citrulline, homocitrulline, cysteic acid, t-butylglycine, t-butylalanine, phenylglycine, cyclohexylalanine, b-alanine, fluoro-amino acids, designer amino acids such as b-methyl amino acids, Ca-methyl amino acids, Na-methyl amino acids, and amino acid analogs in general. Furthermore, the amino acid can be D (dextrorotary) or L (levorotary).

[180] The invention encompasses polypeptides of the present invention which are differentially modified during or after translation, e.g., by glycosylation, acetylation, phosphorylation, amidation, derivatization by known protecting/blocking groups, proteolytic cleavage, linkage to an antibody molecule or other cellular ligand, etc. Any of numerous chemical modifications may be carried out by known techniques, including but not limited, to specific chemical cleavage by cyanogen bromide, trypsin, chymotrypsin, papain, V8 protease,  $\text{NaBH}_4$ ; acetylation, formylation, oxidation, reduction; metabolic synthesis in the presence of tunicamycin; etc.

[181] Additional post-translational modifications encompassed by the invention include, for example, e.g., N-linked or O-linked carbohydrate chains, processing of N-terminal or C-terminal ends), attachment of chemical moieties to the amino acid backbone, chemical modifications of N-linked or O-linked carbohydrate chains, and addition or deletion of an N-terminal methionine residue as a result of procaryotic host cell expression. The polypeptides may also be modified with a detectable label, such as an enzymatic, fluorescent, isotopic or affinity label to allow for detection and isolation of the protein.

[182] Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, beta-galactosidase, or acetylcholinesterase; examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin; examples of suitable fluorescent materials include umbelliferone, fluorescein, fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol; examples of bioluminescent materials include luciferase, luciferin, and aequorin; and examples of suitable radioactive material include iodine ( $^{121}\text{I}$ ,  $^{123}\text{I}$ ,  $^{125}\text{I}$ ,  $^{131}\text{I}$ ), carbon ( $^{14}\text{C}$ ), sulfur ( $^{35}\text{S}$ ), tritium ( $^3\text{H}$ ), indium ( $^{111}\text{In}$ ,  $^{112}\text{In}$ ,  $^{113\text{m}}\text{In}$ ,  $^{115\text{m}}\text{In}$ ), technetium ( $^{99}\text{Tc}$ ,  $^{99\text{m}}\text{Tc}$ ), thallium ( $^{201}\text{Tl}$ ), gallium ( $^{68}\text{Ga}$ ,  $^{67}\text{Ga}$ ), palladium ( $^{103}\text{Pd}$ ), molybdenum ( $^{99}\text{Mo}$ ), xenon ( $^{133}\text{Xe}$ ), fluorine ( $^{18}\text{F}$ ),  $^{153}\text{Sm}$ ,  $^{177}\text{Lu}$ ,  $^{159}\text{Gd}$ ,  $^{149}\text{Pm}$ ,  $^{140}\text{La}$ ,  $^{175}\text{Yb}$ ,  $^{166}\text{Ho}$ ,  $^{90}\text{Y}$ ,  $^{47}\text{Sc}$ ,  $^{186}\text{Re}$ ,  $^{188}\text{Re}$ ,  $^{142}\text{Pr}$ ,  $^{105}\text{Rh}$ , and  $^{97}\text{Ru}$ .

[183] In specific embodiments, a polypeptide of the present invention or fragment or variant thereof is attached to macrocyclic chelators that associate with radiometal ions, including but not limited to,  $^{177}\text{Lu}$ ,  $^{90}\text{Y}$ ,  $^{166}\text{Ho}$ , and  $^{153}\text{Sm}$ , to polypeptides. In a preferred embodiment, the radiometal ion associated with the macrocyclic chelators is  $^{111}\text{In}$ . In another preferred embodiment, the radiometal ion associated with the macrocyclic chelator is  $^{90}\text{Y}$ . In specific embodiments, the macrocyclic chelator is 1,4,7,10-tetraazacyclododecane-N,N',N'',N'''-tetraacetic acid (DOTA). In other specific embodiments, DOTA is attached to an antibody of the invention or fragment thereof via a linker molecule. Examples of linker molecules useful for conjugating DOTA to a polypeptide are commonly known in the art - see, for example, DeNardo et al., Clin Cancer Res. 4(10):2483-90 (1998); Peterson et al., Bioconjug. Chem. 10(4):553-7 (1999); and Zimmerman et al, Nucl. Med. Biol. 26(8):943-50 (1999); which are hereby incorporated by reference in their entirety.

[184] As mentioned, the proteins of the invention may be modified by either natural

processes, such as posttranslational processing, or by chemical modification techniques which are well known in the art. It will be appreciated that the same type of modification may be present in the same or varying degrees at several sites in a given polypeptide. Polypeptides of the invention may be branched, for example, as a result of ubiquitination, and they may be cyclic, with or without branching. Cyclic, branched, and branched cyclic polypeptides may result from posttranslation natural processes or may be made by synthetic methods. Modifications include acetylation, acylation, ADP-ribosylation, amidation, covalent attachment of flavin, covalent attachment of a heme moiety, covalent attachment of a nucleotide or nucleotide derivative, covalent attachment of a lipid or lipid derivative, covalent attachment of phosphatidylinositol, cross-linking, cyclization, disulfide bond formation, demethylation, formation of covalent cross-links, formation of cysteine, formation of pyroglutamate, formylation, gamma-carboxylation, glycosylation, GPI anchor formation, hydroxylation, iodination, methylation, myristoylation, oxidation, pegylation, proteolytic processing, phosphorylation, prenylation, racemization, selenoylation, sulfation, transfer-RNA mediated addition of amino acids to proteins such as arginylation, and ubiquitination. (See, for instance, PROTEINS - STRUCTURE AND MOLECULAR PROPERTIES, 2nd Ed., T. E. Creighton, W. H. Freeman and Company, New York (1993); POSTTRANSLATIONAL COVALENT MODIFICATION OF PROTEINS, B. C. Johnson, Ed., Academic Press, New York, pgs. 1-12 (1983); Seifter et al., Meth. Enzymol. 182:626-646 (1990); Rattan et al., Ann. N.Y. Acad. Sci. 663:48-62 (1992)).

**[185]** Also provided by the invention are chemically modified derivatives of the polypeptides of the invention which may provide additional advantages such as increased solubility, stability and circulating time of the polypeptide, or decreased immunogenicity (see U.S. Patent No. 4,179,337). The chemical moieties for derivitization may be selected from water soluble polymers such as polyethylene glycol, ethylene glycol/propylene glycol copolymers, carboxymethylcellulose, dextran, polyvinyl alcohol and the like. The polypeptides may be modified at random positions within the molecule, or at predetermined positions within the molecule and may include one, two, three or more attached chemical moieties.

**[186]** The polymer may be of any molecular weight, and may be branched or unbranched. For polyethylene glycol, the preferred molecular weight is between about 1 kDa and about 100 kDa (the term "about" indicating that in preparations of polyethylene glycol, some molecules will weigh more, some less, than the stated molecular weight) for



ease in handling and manufacturing. Other sizes may be used, depending on the desired therapeutic profile (e.g., the duration of sustained release desired, the effects, if any on biological activity, the ease in handling, the degree or lack of antigenicity and other known effects of the polyethylene glycol to a therapeutic protein or analog). For example, the polyethylene glycol may have an average molecular weight of about 200, 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 5500, 6000, 6500, 7000, 7500, 8000, 8500, 9000, 9500, 10,000, 10,500, 11,000, 11,500, 12,000, 12,500, 13,000, 13,500, 14,000, 14,500, 15,000, 15,500, 16,000, 16,500, 17,000, 17,500, 18,000, 18,500, 19,000, 19,500, 20,000, 25,000, 30,000, 35,000, 40,000, 45,000, 50,000, 55,000, 60,000, 65,000, 70,000, 75,000, 80,000, 85,000, 90,000, 95,000, or 100,000 kDa.

[187] As noted above, the polyethylene glycol may have a branched structure. Branched polyethylene glycols are described, for example, in U.S. Patent No. 5,643,575; Morpurgo *et al.*, *Appl. Biochem. Biotechnol.* 56:59-72 (1996); Vorobjev *et al.*, *Nucleosides Nucleotides* 18:2745-2750 (1999); and Caliceti *et al.*, *Bioconjug. Chem.* 10:638-646 (1999), the disclosures of each of which are incorporated herein by reference.

[188] The polyethylene glycol molecules (or other chemical moieties) should be attached to the protein with consideration of effects on functional or antigenic domains of the protein. There are a number of attachment methods available to those skilled in the art, such as, for example, the method disclosed in EP 0 401 384 (coupling PEG to G-CSF), herein incorporated by reference; see also Malik *et al.*, *Exp. Hematol.* 20:1028-1035 (1992), reporting pegylation of GM-CSF using tresyl chloride. For example, polyethylene glycol may be covalently bound through amino acid residues via a reactive group, such as a free amino or carboxyl group. Reactive groups are those to which an activated polyethylene glycol molecule may be bound. The amino acid residues having a free amino group may include lysine residues and the N-terminal amino acid residues; those having a free carboxyl group may include aspartic acid residues glutamic acid residues and the C-terminal amino acid residue. Sulfhydryl groups may also be used as a reactive group for attaching the polyethylene glycol molecules. Preferred for therapeutic purposes is attachment at an amino group, such as attachment at the N-terminus or lysine group.

[189] As suggested above, polyethylene glycol may be attached to proteins via linkage to any of a number of amino acid residues. For example, polyethylene glycol can be linked to proteins via covalent bonds to lysine, histidine, aspartic acid, glutamic acid, or cysteine residues. One or more reaction chemistries may be employed to attach polyethylene glycol